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PROCEEDINGS AND TRANSACTIONS

OF

British
THE SOUTH LONDON

**Entomological and Natural History
Society**

1938-39

WITH 10 PLATES



**PUBLISHED AT THE SOCIETY'S ROOMS
HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.**

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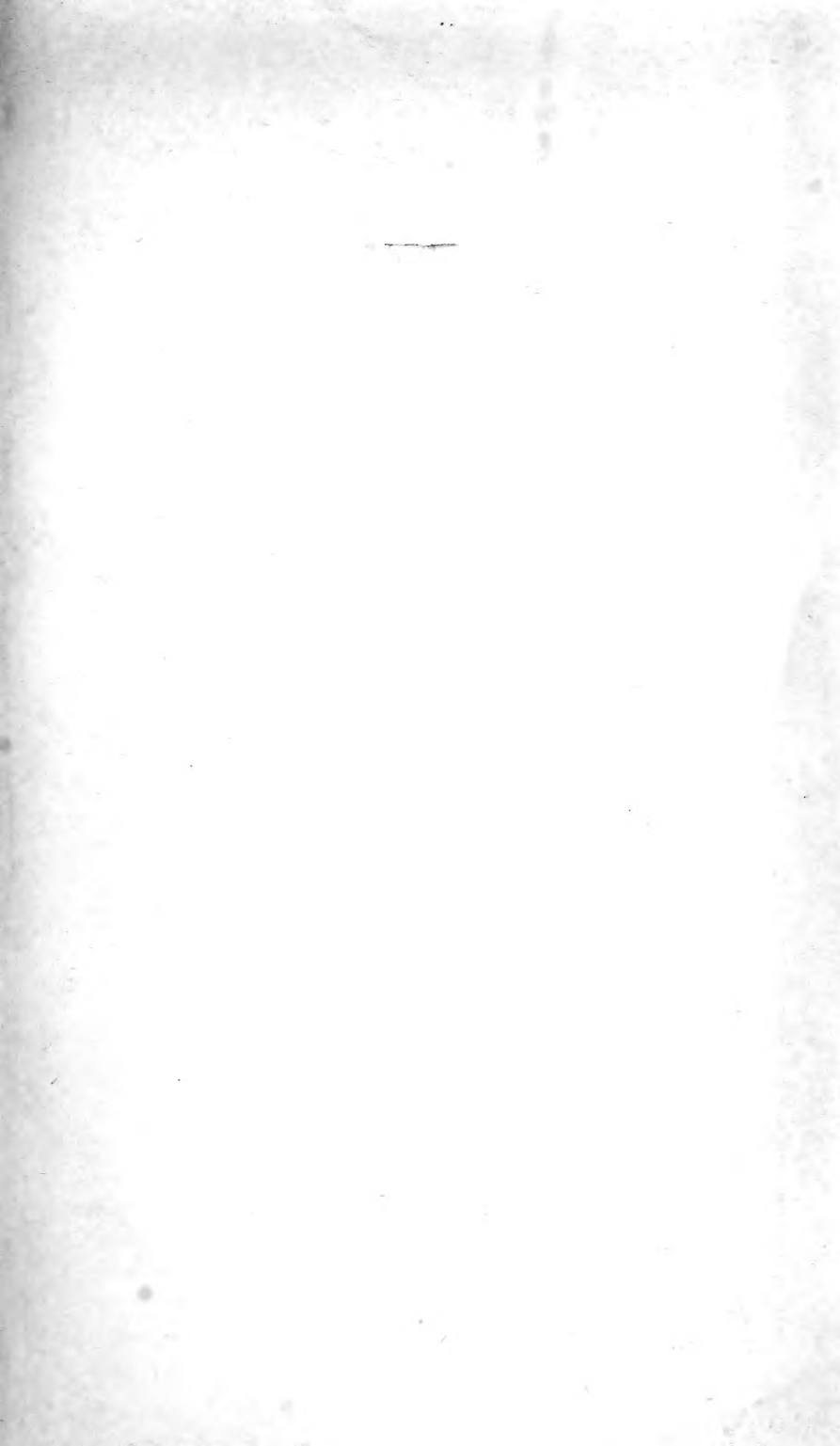
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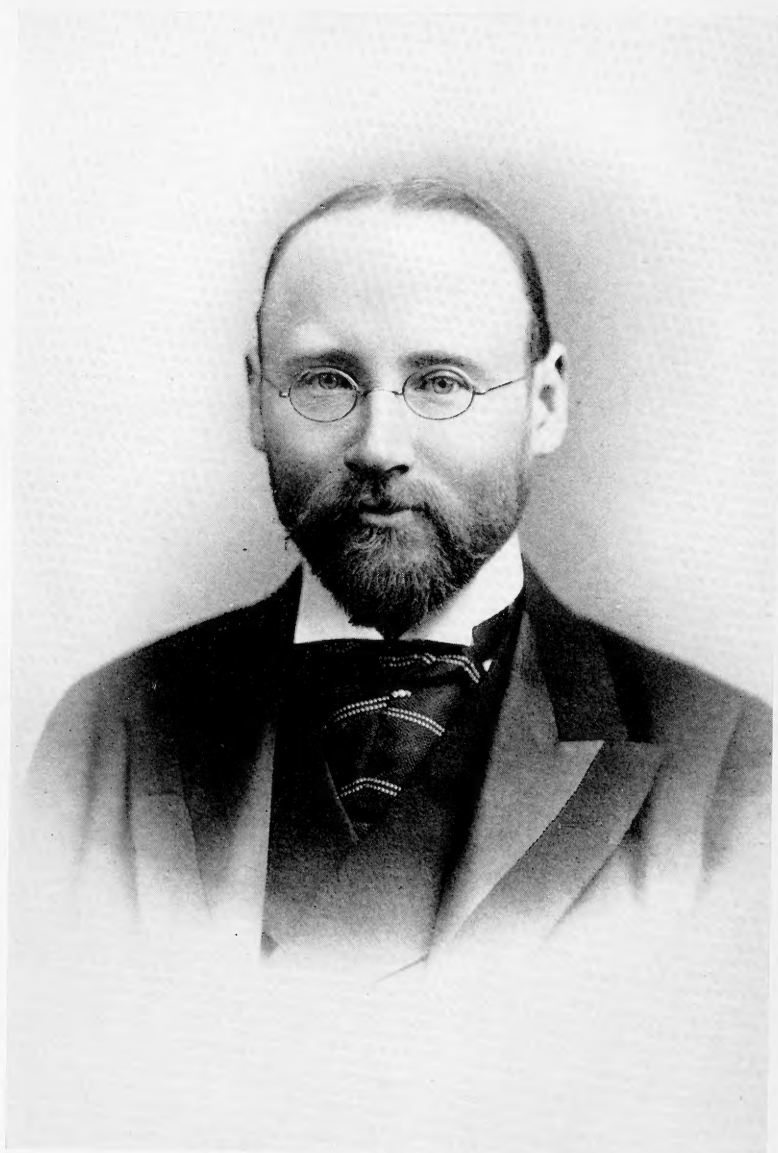
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PUBLISHED AT THE SOCIETY'S ROOMS,
HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.1.

PRICE TEN SHILLINGS AND SIXPENCE.

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THE SOUTH LONDON Entomological and Natural History Society

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.1.

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YEAR OF ELECTION.

- 1937 ADAMS, R. W., 16, Kenton Gardens, Kenton, Middlesex. *l*.
 1886 ADKIN, B. W., F.R.E.S., "Highfield," Pembury, Tunbridge Wells.
l, orn.
 1922 ADKIN, J. H., *Hon. Lanternist*, "Lamorran," Oak Lane, Seven-oaks. *l*.
 1928 ANDERSON, C. D., 22, Mount Park Road, Ealing, W.5.
 1907 ANDREWS, H. W., F.R.E.S., 6, Footscray Road, Eltham, S.E.9. *d*.
 1895 ASHBY, S. R., F.R.E.S., *Hon. Curator*, 37, Hide Road, Headstone, Harrow. *c, l*.
 1934 ATKINSON, J. L., "Down's Cottage," 76, Northwood Road, Tankerton, Kent. *l*.
 1931 ATTWOOD, R. W., *Council*, 36, Tannsfield Road, Sydenham, S.E.26. *l*.
 1936 AUGUST, V. E., 59, Hillcross Avenue, Morden, Surrey. *ent*.
 1937 BALLINGER, D. E., "The Cottage," Canham Road, Acton, W.3. *l*.
 1896 BARNETT, T. L., 31, Littleheath Road, Selsdon, Surrey. *l*.
 1887 BARREN, H. E., 78, Lyndhurst Road, Peckham, S.E.15. *l*.
 1933 BAYNES, Capt. E. S. A., F.R.E.S., "Monkshatch Cottage," Comp-ton, near Guildford. *l*.
 1927 BEDWELL, E. C., F.R.E.S., 54, Brighton Road, Coulsdon, Surrey.
c, hem.
 1938 BEIRNE, B. P., 4, Toberner Terrace, Monkstown, Co. Dublin, Eire.
micro-l.
 1929 BELL, J. H., F.R.E.S., Dudswell Rise, Northchurch, Berkhamstead, Herts.
 1911 BLAIR, K. G., D.S.C., F.R.E.S., 11, Durrington Park Road, Wimbledon, S.W.20. *n, c*.
 1926 BLISS, A., 4, Monahan Avenue, Purley. *l*.
 1925 BLYTH, S. F. P., "Cleaveland," Chislehurst, Kent. *l*.
 1934 BORRER, C. D., "The Old Manor House," Cley-next-Sea, Norfolk.
 1935 BOWLES, T. J., "Oakleigh," Knole Road, Dorking, Surrey. *l*.
 1933 BRETT, G. A., B.S.C., A.R.C.S., *Council*, 2 Old Claygate Lane, Hinchley Wood, Esher, Surrey. *ent*.

JUL - 5 1937

YEAR OF
ELECTION.

- 1935 BRETT, Mrs S. L. F., 2 Old Claygate Lane, Hinchley Wood, Esher, Surrey. *biology*.
- 1936 BRIEGEL, R. H., 141, Burnt Oak Lane, Sidecup, Kent.
- 1909 BRIGHT, P. M., F.R.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l*.
- 1930 BROOKE, Miss W. M. A., c/o Dr Brooke, 99, The Avenue, Muswell Hill, N.10. *ec. ent, b, marine life*.
- 1939 BROWN, A. G., L.D.S., R.C.S.ENG., 17, The Vale, Golders Green, N.W.11. *l*.
- 1936 BROWN, MAXWELL, West Kent Hotel, Bickley, Kent. *ent*.
- 1938 BROWN, S. H., L.D.S., R.C.S.ENG., 194, Golders Green Road, N.W.11. *l*.
- 1936 BUCK, F. D., 49, Elthorne Road, Holloway Road, N.19. *c*.
- 1938 BUCKLEY, W., F.R.E.S., M.I.GAS E., 5, Westfield Road, Cheadle Hulme, Cheshire. *l*.
- 1909 BUCKSTONE, A. A. W., 90, Pams Way, Kingston Road, Ewell. *l*.
- 1927 BULL, G. V., B.A., M.B., *Council*, "White Gables," Sandhurst, Kent. *l*.
- 1938 BURTON, JOHN, M.R.C.S., L.R.C.P., "Newlands," 212, Golders Green Road, N.W.11. *c*.
- 1938 BURTON, R. J., L.D.S., F.R.C.S.(ENG.), "Newlands," 212, Golders Green Road, N.W.11. *l*.
- 1938 BURTON, Miss MARGARET, "Newlands," 212, Golders Green Road, N.W.11. *biology*.
- 1922 BUSHBY, L. C., F.R.E.S., 33c, Regent's Park Road, N.W.1. *c, hem*.
- 1937 CARDEW, Col. P. A., 21A, Thornton Hill, Wimbledon, S.W.19. *l*.
- 1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs. *l, n*.
- 1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate.
- 1936 CHARTRES, S. A., 9, King's Drive, Eastbourne, Sussex. *ent*.
- 1922 CHEESEMAM, C. J., 100, Dallinger Road, S.E.12. *l*.
- 1936 CLASSEY, E. W., 141, Portnall Road, Maida Hill, W.9. *ent*.
- 1915 COCKAYNE, E. A., D.M., F.R.C.P., F.R.E.S., *Vice-President*, 16, Westbourne Street, W.2. *l*.
- 1934 COLE, G., 8A, Belsize Park Gardens, N.W.3. *l*.
- 1935 COLLINS, R. J., "Appledore," Mugswell, Chipstead, Surrey. *l*.
- 1899 COLTHRUP, C. W., 68, Dovercourt Road, E. Dulwich, S.E.22. *l, oo, orn*.
- 1938 CONDER, G. M., M.R.C.S., L.R.C.P., L.D.S., 33, Grove Avenue, Sutton, Surrey. *l*.
- 1936 COOPER, B. A., 61, Okehampton Road, London, N.W.10. *ent*. (*Life Member*.)
- 1907 COOTE, F. D., F.R.E.S., *Council*, 32, Wickham Avenue, Cheam, Surrey. *l, b*.
- 1923 CORK, C. H., 11, Redesdale Street, Chelsea, S.W.3. *l*.

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- 1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E.18. *l, c.*
- 1922 COUCHMAN, L. E., c/o Mrs A. Couchman, 103 Oakdene Road, St Mary Cray, Kent. *l.*
- 1909 COULSON, F. J., *Council*, "Burnigill," 24, Springfield Avenue, Merton Park, S.W.20. *c, hem.*
- 1928 COURT, T. H., "Oakleigh," Market Rasen, Lincoln.
- 1937 CRABTREE, B. H., "Highfield," Alderley Edge, Cheshire. *l.*
- 1935 CRASKE, E. S., "Hillsboro," Gringer Hill, Maidenhead, Berks.
- 1934 CRASKE, J. C. B., F.R.E.S., 57, Cornwall Gardens, S.W.7.
- 1937 CRASKE, R. M., 12A, Lower Belgrave Street, S.W.1. *ent.*
- 1918 CRAFTURD, CLIFFORD, "Denny," Bishops Stortford. *l.*
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, Northwich, Cheshire. *l.*
- 1920 CROCKER, Capt. W., 55, Townley Road, Bexley Heath, Kent. *l.*
- 1932 CROW, P. N., "Heathcote," Bigfrith, Cookham Dean, Berkshire. *l.*
- 1937 CURTIS, A. E., "The Cottage," Ifold Estate, Loxwood, Billingshurst, Sussex.
- 1927 DANBY, G. C., "Sheringham," 31, Albion Road, Sutton, Surrey. *l.*
- 1925 DANNATT, WALTER, F.R.E.S., F.Z.S., 94, Guibal Road, Lee, S.E.12. *l, c l.*
- 1938 DAVIES, O. C., 33, Hopton Road, Streatham, S.W.16. *l.*
- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l, c.*
- 1937 DEAL, JAMES, 18, Manor Road, West Wickham, Kent. *l.*
- 1933 DEMUTH, R. P., 7, Holland Park Avenue, W.11. *l.*
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*
- 1930 DENVIL, H. G., *Hon. Minuting Secretary*, 4, Warwick Road, Coulsdon, Surrey. *l, c.*
- 1901 DODS, A. W., 35, The Mall, Southgate, N.14. *l.*
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading. *l.*
- 1936 DOUDNEY, S. P., "Thurne," 110, Foxley Lane, Purley, Surrey. *l.*
- 1938 DOWN, C., 7, Mer sham Drive, Kingsbury, N.W.9. *ent.*
- 1930 DOWNES, J. A., B.S.C., 120, Pepys Road, Wimbledon, S.W.20. *ent, l.*
- 1930 DUDBRIDGE, B. J., B.A., Colonial Administrative Service, Tanganyika, c/o The Secretariat, Dar-es-Salaam; and 13, Church Lane, Merton Park, London, S.W.19. *ent.*
- 1927 EAGLES, T. R., *Hon. Treasurer*, 32, Abbey Road, Enfield, Middlesex. *l, c.*
- 1937 EASTON, N. T., "Akuna," Holyhead Road, Menai Bridge, Anglesey. *l.*
- 1933 ELGOOD, W. S., North Bank, Wisbech, Cambs.
- 1923 ELLIS, H. WILLOUGHBY, F.R.E.S., F.Z.S., M.B.O.U., Friary Hill, Weybridge, Surrey. *c, orn.*
- 1937 EMBRY, B., F.R.E.S., St Bartholomew's Vicarage, Dover, Kent. *l.*

YEAR OF
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- 1932 ENNIS, L. H., 16, Ernle Road, Wimbledon, S.W.20. *l.*
 1935 ENSOR, G. A., "Oakleigh," Knole Road, Dorking, Surrey.
 1920 FARMER, J. B., 156, Loughborough Park, Brixton, S.W.9. *l.*
 1924 FASSNIDGE, WM., M.A., F.R.E.S., 4, Bassett Crescent West, Southampton. *l, n, hem.*
 1930 FERRIER, W. J., 86, Portnalls Road, Coulsdon, Surrey. *l.*
 1936 FINNIGAN, W. J., 6, Shrublands Grove, Worcester Park, Surrey.
ent.
 1887 FLETCHER, W. H. B., M.A., F.R.E.S., Aldwick Manor, Bognor
 Regis, Sussex. (*Life Member.*) *l.*
 1926 FLETCHER, P. BAINBRIGGE, M.SC., A.I.C., F.R.E.S., "Winscombe,"
 Copsem Drive, Esher, Surrey. *c, l.*
 1889 FORD, A., "South View," 42, Irving Road, West Southbourne,
 Bournemouth, Hants. *l, c.*
 1920 FORD, L. T., "St Michael's," Park Hill, Bexley, Kent. *l.*
 1915 FOSTER, T. B., "Downlands," 24, York Road, Selsdon, Surrey. *l.*
 1907 FOUNTAINE, Miss M. E., F.R.E.S., "The Studio," 100A, Fellows
 Road, Hampstead, N.W.3. *l.*
 1933 FRASER, ANGUS, "Ranelagh," Gloucester Rd., Tankerton, Kent. *c.*
 1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., "Heavers,"
 Ryarsh, Kent. *l.*
 1912 FROHAWK, F. W., F.R.E.S., M.B.O.U., "Essendene," Cavendish
 Road, Sutton, Surrey. *l, orn.*
 1930 GILLIATT, F. T., F.R.E.S., 25, Manor Road, Folkestone, Kent. *l.*
 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston,
 Surrey. *l.*
 1936 GOODBAN, B. S., F.R.E.S., 81, West Street, Ewell, Surrey. *l.*
 1936 GOODE, FRANK, 275, Eastern Avenue, Ilford, Essex. *l.*
 1935 GOODLIFFE, F. D., Lord Wandsworth Agricultural College, Long
 Sutton, Basingstoke. *ec. ent.*
 1926 GORDON, D. J., B.A., F.R.E.S., "Craigellachie House," Strathpeffer,
 Ross. *c, l.*
 1924 GRANT, F. T., 37, Old Road West, Gravesend. *l.*
 1924 GREER, T., J.P., "The Bungalow," Sandholes, Dungannon, Co.
 Tyrone. *l.*
 1926 GREY, Mrs OLIVE, F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*
 1933 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe,
 Croydon.
 1934 GUNTON, Major H. C., M.B., F.R.E.S., "Rathgar," Gerrards Cross,
 Bucks. *l.*
 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfields Road, Oxford. *l.*
 1903 HARE, E. J., F.R.E.S., 41, Avenue Gardens, Acton, W.3. *l.*
 1926 HARMSWORTH, Sir HILDERBRAND A. B., F.R.E.S., 19, Princes Gate
 Court, S.W.7.
 1937 HARRIS, H. G., M.D., B.SC. (DURHAM), 5, Archer's Road, Southamp-
 ton. *l.*

YEAR OF
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- 1936 HARRIS, W. H. A., 48, Corringway, W.5. *l*.
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road, Winton, Bournemouth. *l*.
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, S.W.2. *l*.
- 1924 HAWKINS, C. N., F.R.E.S., 23, Wilton Crescent, Wimbledon, S.W.19. *l*.
- 1929 HAWLEY, Lt.-Col. W. G. B., D.S.O., Sibton Church Farm, Yoxford, Suffolk.
- 1938 HAYNES, R. F., 118, Court Lane, Dulwich, S.E.21. *l*.
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental, Concordia, F.C.E.R., Argentina. *l, orn, c*.
- 1937 HAYWARD, L. W., "Westoe," 31, Bower Mount Road, Maidstone, Kent. *ent*.
- 1936 HEDGES, A. V., F.R.E.S., "Milton Ernest House," Milton Ernest, Beds. *l*.
- 1920 HEMMING, Capt. A. F., C.M.G., C.B.E., F.Z.S., F.R.E.S., 18, Glebe Place, Chelsea, S.W.3. *l*.
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c*.
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., 34, Henleaze Gardens, Westbury-on-Trym, Bristol and Nigerian Administrative Service, Obetim, Warri Province, viâ Sapele, Southern Nigeria, West Africa. *l*.
- 1927 HEWER, H. R., M.Sc., D.I.C., Royal College of Science, S. Kensington, S.W.7.
- 1937 HICK, E. PENTLAND, Athol House, Scarborough, Yorks. *l*.
- 1920 HODGSON, S. B., "St Philips," 22, Charles Street, Berkhamsted, Herts.
- 1937 HOLFORD, H. O., "Elstead Lodge," Godalming, Surrey. *l*.
- 1937 HOPE, Dr JOHN, "Marisholm," Moseley Road, Cheadle Hulme, Cheshire. *l*.
- 1927 HOWARD, J. O. T., M.A., *Council*, "Wedderburn House," Hampstead, N.W.3.
- 1931 HOWARTH, T. G., F.R.E.S., 77, Woodland Rise, Muswell Hill, N.10. *l*.
- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea. *l, ent*.
- 1929 HUGHES, A. W., "Delamere," Buckingham Way, Wallington. *l*.
- 1939 HULLS, L. G., F.C.S., F.R.M.S., F.R.E.S., "Rax," Chidham, near Chichester, Sussex. *ent*.
- 1938 HUMPHREYS, J. A., White Cross Service Station, Sutton By Pass, Sutton, Surrey. *l*.
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l*.
- 1928 JACKSON, F. W. J., "The Pines," Ashtead, Surrey.
- 1923 JACOBS, S. N. A., *Hon. Secretary*, "Ditchling," 54, Hayes Lane, Bromley. *l, e l*.
- 1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l*.

YEAR OF
ELECTION.

- 1924 JAMES, R., F.R.E.S., 14, Golden Lane, E.C.1. *l*.
- 1936 JAMES, W. H., 41, Carson Road, Dulwich, S.E.21. *l*.
- 1927 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent*.
- 1925 JARVIS, C. McK., 68, Clyfford Road, West End Road, Ruislip, Middlesex. *c*.
- 1938 JARVIS, F. V. L., B.SC., 21, Shirley Avenue, Sutton, Surrey.
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea. *l*.
- 1933 JONES, H. G. C., "Shere," 33, Berrylands, Surbiton, Surrey. *l*.
- 1928 KETTLEWELL, Dr H. B. D., "Homefield," The Common, Cranleigh, Surrey. *l*.
- 1910 KIDNER, A. R., "Southwood," The Drive, Sidcup, Kent. *l*.
- 1925 KIMMINS, D. E., 2, Avington Grove, Penge, S.E.20. *l*.
- 1933 KING, H., D.SC., F.R.S., "Gavarnie," Wise Lane, Mill Hill, N.W.7. *l, orn*.
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, S.W.3.
- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l*.
- 1922 LEECHMAN, CAREY B., "Pansala," Roundabouts, Pulborough, Sussex. *l*.
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l*.
- 1934 LINE, H. V., "Brookside," St Peter's Road, Orpington.
- 1933 LIPSCOMB, Capt. C. G., Misterton, Somerset.
- 1938 LISNEY, A. A., M.A., M.B., F.R.E.S., The Red House, Harborough, Leicester. *l*.
- 1936 LOWE, Capt. J. H. B., R.A. and R.E. Mess, Wana, Waziristan, India. *l*.
- 1931 MACNULTY, B. J., "Rutland," 67 All Saints Road, Sutton, Surrey. *l*.
- 1892 MAIN, H., B.SC., F.R.E.S., F.Z.S., 9, Woodside Road, Woodford Wells, Essex. *l, nat. phot, c*.
- 1889 MANSBRIDGE, W., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c, etc*.
- 1932 MARCON, Rev. J. N., Christ Church Vicarage, Seaside Road, Eastbourne. *l*.
- 1930 MARSH, D. G., "Brackla," 31, The Crossways, Sutton, Surrey. *l*.
- 1922 MASSEE, A. M., D.SC., F.R.E.S., East Malling Research Station, Kent. *l*.
- 1932 MELLOWS, W. T., M.B.E., LL.B., 17, The Precincts, Peterborough, Northants. *l*.
- 1938 MINNION, W. E., "Quendon," Court Road, Banstead, Surrey. *l*.
- 1889 MOORE, H., F.R.E.S., 9 Hoopwick Street, Deptford, S.E.8. *l, hem, d, e l, e hym, e d, mi*.
- 1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone.

YEAR OF
ELECTION.

- 1920 MORISON, G. D., B.Sc., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen. *ec. ent.*
- 1937 MORTIMER, D. A., Comberton Hotel, 13 Station Hill, Kidderminster, Worcs. *hym.*
- 1937 MOWBRAY, M. J., 80, Woodlands Avenue, Wanstead, E.11. *ent.*
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey.
- 1934 MUSGRAVE, A. J., 21, Loveday Road, W.13.
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l.*
- 1930 NIBLETT, M., *Council*, 10, Greenway, Wallington, Surrey. *galls.*
- 1936 NORTON, S. G. WALLIS, "Norton House," Peaks Hill, Purley, Surrey. (*Life Member.*) *ent.*
- 1939 ODD, D. A., "Hammer House," Holmwood Road, Cheam, Surrey. *l.*
- 1932 O'FARRELL, A. F., *Council*, 20, Crescent Rd., Wimbledon, S.W.19. *od, cr, ent.*
- 1934 OLIVER, G. B., "Hazlemere," High Wycombe, Bucks. *l.*
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, S.E.3. *l.*
- 1908 PENNINGTON, F., 47, "Apsley House," Finchley Road, N.W.8. *l.*
- 1928 PERKINS, J. F., B.Sc., F.R.E.S., 95, Hare Lane, Claygate, Surrey. *h.*
- 1933 PEYTON, A. G., 29, Grove Road, Ramsgate. *l.*
- 1933 PINHEY, E. C. G., 36, Wetherby Mansions, Earl's Court Square, London, S.W.5. *ent.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, E.4. *od, l.*
- 1933 POOLES, S. W. P., "Richmond," Alderman's Drive, Peterborough. *l.*
- 1912 POULTON, Prof. Sir E. B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)
- 1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane, Richmond, Surrey.
- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 136, Coldershaw Road, W. Ealing, W.5. *l, mo.*
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middlesex. *l.*
- 1936 RICHARDSON, N. A., 68, Finchley Lane, Hendon, N.W.4. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Surrey. (*Life Member.*)
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon, S.W.20. *l.*
- 1939 RIPPON, C., M.A., J.P., F.R.E.S., "Red Lodge," Cold Ash, Newbury, Berks. *l.*

YEAR OF
ELECTION.

- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l*.
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark. *l, n*.
- 1936 ROYFFE, D. W., 152, Tudor Drive, Morden, Surrey. *c, ent*.
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading.
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., "Scarbank House," Swanage, Dorset. *l*.
- 1936 RUSSELL, J. A. P., "Scarbank House," Swanage, Dorset. *ent*.
- 1915 RUSSELL, S. G. CASTLE, "Cotswold," Forest Gardens, Lyndhurst, Hants. *l*.
- 1939 SCHABEL, Miss HILDA, Joldwynds Stables, Holmbury St Mary, near Dorking, Surrey. *b, ent*.
- 1936 SCOPES, GOWING E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l*.
- 1908 ST AUBYN, Capt. J. G., F.R.E.S., F.R.P.S., 14, Purley Knoll, Purley.
- 1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l*.
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Ralli Bros., Ltd., Calcutta. (*Life Member.*) *l*.
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough. *l*.
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l*.
- 1938 SHERRIN, W. R., A.L.S., F.Z.S., South London Botanical Institute, 323, Norwood Road, Herne Hill, S.E.24. *c, l*.
- 1898 SICH, ALF., F.R.E.S., "Coburg Court Hotel," Bayswater Road, W.2. *l*.
- 1921 SMART, Major H. D., R.A.M.C., M.D., D.SC., F.R.E.S., 172, High Road, Salway Hill, Woodford Green. *l*.
- 1939 SMITH, S. GORDON, F.L.S., F.R.E.S., "Estyn," Boughton, Chester. *ent*.
- 1938 SNELL, B. B., "Woodsome," Bromborough, Cheshire. *Heterocera*.
- 1908 SPERRING, C. W., 85, The Manorway, Blackheath, S.E.3. *l*.
- 1938 STAFFORD, A. E., "Corydonis," 83, Colbourne Way, Worcester Park, Surrey. *l*.
- 1927 STANLEY-SMITH, F., F.R.E.S., *Vice-President*, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l*.
- 1928 STANLEY-SMITH, Mrs MAUD, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l*.
- 1937 STEDALL, H. P. P., "Cherry Cottage," Prestwood, Great Missenden, Bucks. *ent*.
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham.
- 1936 STIGAND, Miss B., 175, Gloucester Place, London, N.W.1. *hortic. ent*.
- 1938 STIRLING, D. H., 36 Estella Avenue, New Malden, Surrey. *l*.
- 1924 STOREY, W. H., 3, Highlands Road, Reigate, Surrey. *ent*.
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., "Sevenhurst," 42, Chalkwell Avenue, Westcliff-on-Sea, Essex.
- 1936 STREETER, ERNEST, Petworth, Sussex. *l*.

YEAR OF
ELECTION.

- 1929 STUBBS, G. C., Topo Surveys, Kuamtan, Federated States of Malay.
- 1938 SUMMERS, E. J., 33, Cumnor Road, Sutton, Surrey. *c, hem.*
- 1934 SUTTON, G. R., *Council*, 6, Kenilworth Gardens, Loughton, Essex. *l, c.*
- 1916 SYMS, E. E., F.R.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *n, orth, od, t.*
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, S.W.6. *l.*
- 1913 TATCHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1934 TAYLOR, J. O., "Lyndhurst," Grosvenor Road, Orpington. *l.*
- 1925 TAYLOR, J. S., M.A., F.R.E.S., P.O. Box 45, Graaff-Reinet, C.P., Union of S.A. *l.*
- 1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.
- 1931 THOMPSON, J. A., F.R.E.S., Rhos School, Colwyn Bay, N. Wales. *l.*
- 1935 TOMPKINS, L. H., "Clifton," 18, Forest Side, Worcester Park, Surrey.
- 1902 TONGE, A. E., F.R.E.S., "Aincroft," Grammar School Hill, Reigate. *l.*
- 1937 TONGE, A. E., F.R.E.S., "Ashville," Trafford Road, Alderley Edge, Cheshire. *l.*
- 1934 TUNSTALL, H. G., 11, St James Avenue, Ewell, Surrey.
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. (*Hon. Member.*) *l, b, e l.*
- 1937 VALLINS, F. T., 2, Tattenham Grove, Epsom Downs, Surrey. *l.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. CHAS., 9, Priory Road, Hook Road, Surbiton, Surrey.
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 7, Parkside Gardens, Wimbledon, S.W.19. *l.*
- 1930 WAKELY, S., *Council*, 4, Auckland Rd., Upper Norwood, S.E.19. *l.*
- 1936 WARRIER, R. E., 147, Friern Road, London, S.E.22. *l.*
- 1939 WATKINS, NORMAN A., "Belcombe Court," Bradford-on-Avon, Wilts. *l.*
- 1920 WATSON, D., "Crossways," Hightown, Ringwood, Hants. *l.*
- 1928 WELLS, CLIFFORD, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., "York Gate," Cheam Road, Ewell. *l.*
- 1937 WELT, A., "Roswyn," 141, Perry Vale, Forest Hill, S.E.23.
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. Sir H. BECKWITH, M.B., M.S.LOND., F.R.C.S., F.R.E.S., 62, Hagley Road, Birmingham, 16. *l.*
- 1925 WILLIAMS, H. B., LL.D., F.R.E.S., *President*, "Croft Point," Bramley, Surrey.
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, E.4. *l.*

YEAR OF
ELECTION.

- 1938 WILLIS, J. R., Vine Cottage, West Horsley, Surrey. *l.*
 1927 WITTING, A. N., 6, Woolstone Road, Forest Hill, S.E.23.
 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
 1926 WOOTTON, W. J., F.R.H.S., "Wannock Gardens," Polegate, Sussex. *l.*
 1927 WORMS, BARON DE, M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C.,
 "Milton Park," Egham, Surrey. *l, orn.*

Members will greatly oblige by informing the Hon. Sec. of any errors in, additions to, or alterations required in the above Addresses and descriptions.

REPORT OF THE COUNCIL FOR 1938.

In giving an account of the Society's activities during the past year, there is much of interest, which might have been included, but which will be found in its rightful place amongst the reports of meetings.

At the beginning of the year your Council decided, by way of an experiment, to appoint two Assistant Secretaries whose task it would be to submit draft programmes for the adoption of the Council, the one being entrusted with the indoor, and the other with the outdoor programme.

It was also decided to affiliate the Society, although very much senior, to the Ramblers' Association (Southern Federation), and this has proved to be a good move, in that accommodation can be reserved on the "Ramblers' Trains" run in conjunction with the Railway Companies. These trains were used on 10th April for Groombridge, 22nd May for the Isle of Wight, 19th June for the New Forest (Braemore), 18th September for Tilgate Forest, and 30th October again for the New Forest. Our visit to the historic collecting ground of Tilgate Forest was the first of our meetings to be referred to in the day's bulletin published by the Ramblers' Association, with the result that four strangers gathered under our sign (a butterfly net) and followed our fortunes in the field. It is hoped to attract occasional recruits in this way.

The success attending the extension of the number of field meetings last year encouraged your Council to carry this experiment still farther, so that twenty-three field meetings in all were scheduled for the season, and although there was a falling off in attendance during the holiday period, as was only to be expected, the experiment was definitely successful, as evidenced by the attendance, and the interest in the field of members in Orders other than Lepidoptera. Beside the original twenty-three meetings, three others were subsequently arranged, namely, to the New Forest on 19th June and 30th September, and to Bookham on 14th October.

Exceptional weather conditions, an unexpected and unprecedented warmth in the early spring made it necessary to hold the two sallowing meetings a fortnight earlier than scheduled, i.e. on 26th March and 2nd April, but even so, at the first meeting, sallow was past its best, and blackthorn in full bloom, and at the second, sallow was quite over and blackthorn past its best. Then there was a period of drought and cold, unbroken until May, which month, as is its wont and in spite of the babblings of spring poets, was unpleasant and cold, and quite upset the expectations of entomologists; some insects were advanced by the early warmth while others were retarded by the later cold. Fortunately the day planned for the visit to the Isle of Wight was not only fine, but warm also, so that its success stands out from a list of meetings spoiled

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by rain and cold winds. Bad weather spoiled the meetings on 28th May at Brentwood, and on 7th August at Byfleet. The Leith Hill meeting on 27th August was altered to Mickleham Down on account of the difficulty of access and the effects of recent fires. Then again, the area proposed for working, having been cut up for building purposes, the Chislehurst meeting on 10th September was abandoned and Ashted Woods substituted. Owing to the international crisis in September, the Oxshott meeting for 1st October had been abandoned, and was eventually only attended by the leader and two others.

While considering the outdoor programme, your Council decided that an attempt might be made to organise visits to places of interest during the winter months, and the first of these visits, namely, to the Department of Entomology of the British Museum, Cromwell Road, was well attended, the party numbering some thirty members and friends, and under the care of Captain Riley and Doctor Blair a most interesting time was spent, which success, if continued, will ensure that further meetings of this kind will be included in the winter programmes of the future.

There were the usual twenty-two ordinary meetings, the annual general meeting, and the annual exhibition, the average attendance at ordinary meetings being 51.

The details of the field meetings and papers read are given below in tabular form showing the names of the members responsible, and to these gentlemen, and especially to the Programme Secretaries, are due the Society's best thanks; to the field meeting leaders for having made the necessary arrangements, to the readers of papers for the time and trouble taken, and to the exhibitors of lantern slides for their kindness in lending these slides and adding interest to the lantern evenings. While on the subject of lantern slides, recognition should also be accorded to those gentlemen who have given so much time to the task of compiling a working index to the magnificent collection of lantern slides left to the Society by the late Mr Robert Adkin. Certain of these slides have been loaned outside the Society for exhibition, and duly returned in perfect order.

Papers were read by F. Stanley Smith, H. W. Andrews, Dr C. G. M. de Worms, L. H. Ennis, M. Niblett, H. R. Humphreys, S. N. A. Jacobs, E. J. Nixon, S. Wakely, and Hy. J. Turner.

Demonstrations with Lantern by H. C. Ward, H. J. Finnigan, R. Ridley, A. F. O'Farrell; and Mr L. W. Newman gave an account of his entomological experiences.

Lecture by Mrs Boardman, "Westward to the Golden Gate." H. Main, Report of the Berlin Congress of Entomology.

Field Meetings led by—Effingham, T. R. Eagles; Bookham, C. N. Hawkins; Broadwater Forest, Dr G. V. Bull; Oxshott, F. J. Coulson; Cutt Mill, F. Stanley Smith; Horsley, F. D. Coote; I. of Wight, S. Wakely; Ascot, L. H. Ennis; New Forest, F. D. Coote; Forest Row, H. G. Denvil; Witley, F. D. Coote; S. Benfleet, R. W. Attwood; Chal-

font, Dr K. G. Blair; Chipstead, R. J. Collins; Byfleet, A. Harris; Ashstead, B. S. Goodban; Eynsford, S. N. A. Jacobs; Mickleham Downs, S. Wakely; Westerham, S. N. A. Jacobs; Ashted, R. W. Attwood; Tilgate Forest, T. R. Eagles; Bookham, F. D. Coote; Holmsley N.F., F. D. Coote; and to the British Museum, N. D. Riley and Dr Blair.

The annual exhibition was held as usual on the fourth Thursday in October (27th), and the book shows a record attendance, some 275 members and friends having signed. In spite of this large attendance, however, a thoughtful arrangement of the tables resulted in very much greater ease of access to the exhibits than has on previous occasions been possible. It is to be feared that Lepidoptera constituted an even larger proportion of the exhibition than usual, but the excellence of the exhibits should make apology unnecessary. Other Orders were also represented beside the usual and ever popular section for living exhibits, and also a section for drawings, of which there were some excellent examples. The thanks of the Society are due to all exhibitors, and if all exhibits are not fully described in the Proceedings, it may be that they were not adequately labelled at the exhibition.

The annual volume of Proceedings and Transactions for 1937-38 duly appeared in the summer in spite of a certain amount of difficulty in the matter of printing, but this was satisfactorily overcome by the editor and publications committee. It consists of 98 + xxv pp. and 8 plates, and has, as usual, been dealt with favourably by the entomological periodicals. The editor has had a difficult task in keeping down the matter of only passing interest, so as to allow a maximum of space for the matter of permanent value to entomologists and naturalists in general; the fact, however, that so much material has been contributed, speaks well for the keenness of members, and members whose notes are not printed in their entirety will understand the reasons for this curtailment.

The Treasurer's Report you have just heard, and the Council desires to emphasise that without the aid of generous benefactors, and the special collection made for exhibition expenses, the Society would not be meeting its present annual expenditure out of income. So long as this condition obtains, the future cannot be regarded with complacency; the remedy for this lies in the recruiting of new members; an addition of at least forty is necessary to make the future secure.

It must again be stated that the Treasurer, an honorary official, would be saved a great deal of unnecessary trouble if all members in a position to do so would pay their subscriptions by banker's order; they are thus paid to the Society's account on the 1st January of each year with no further trouble to either member or Treasurer. Those who are not in a position to act in this way can assist greatly by paying their subscription promptly at the beginning of the year. Requests for subscriptions should be quite unnecessary although the Treasurer has still to send out as many as three reminders to some members!

The membership of the Society shows a slight increase from 256 to 260; during the year 20 new members were admitted, there were 11 resignations, 2 members were struck off, and there were 3 deaths. There are now 209 full members, 44 country members, 5 life members, and 2 honorary members.

The Curator reports that during the year he has made considerable progress with the collation and rearrangement of the collections of Diptera and Hymenoptera, incorporating the gifts which have been received. Donations to the collections were made by Mr H. W. Andrews, Dr K. G. Blair, Mr R. J. Collins, Dr E. A. Cockayne, Mr H. G. Denvil, Mr H. St. J. K. Donisthorpe, Mr W. H. A. Harris, Mr S. N. A. Jacobs, and Mr W. Mansbridge. Members might acquaint themselves with deficiencies in the Society's collections in the groups which they work, so that when the opportunity occurs, these deficiencies may be made good.

The Librarian reports the continued use of the library which has, as usual, been increased by gifts and exchange, but this year there have been extensive purchases by the Society of many extremely useful works, which have appeared during the year, so that the value of the library for reference has been greatly enhanced.

As no details of additions were published for 1937-38, these are published below together with acquisitions of 1938-39, and are as follow:—

BOOKS (Exchange and Donation).

Instructions for Collecting Reptiles, Amphibians and Fishes, B.M. Pubn.
Student's Index to the Collections of Minerals, B.M. Pubn.

"From Stone to Steel," Horniman's Museum.

"Life-History of N. American Birds of Prey," Smithsonian Inst.

"Some Breeding Experiments on the Geometer *II. abruptaria* and two of its melanic varieties," G. A. Brett.

"Birds of El Salvador," Field Museum of Chicago.

BOOKS (Special Donations).

"British Neuroptera," Killington (Mr Coulson and Mr Jacobs), 2 vols.

"Beautiful Butterflies of the Tropics," Twidle (Mr Goodban).

"Solitary Wasps," Peckham (Mr Ferrier).

"Tsetse Flies of E. Africa," Swynnerton (Mr Coote).

"Our Native Ferns," Lowe (Mr Coulson).

"Native Orchids of Britain," Tahourdin (Mr E. E. Symes).

"New Bilingual Cat. of the Brit. Lepidoptera," I. R. P. Heslop (The author).

"Insect Singers," G. F. Myers.

BOOKS (Purchase).

"Monograph of the Brit. Aberrations of *L. coridon*," P. M. Bright and H. A. Leeds.

"Varieties of British Butterflies," F. W. Frohawk.

"Ichneumons of Great Britain," 5 vols., Claude Morley.

- "Seitz Supplement to Vol. III, Palaearctic Noctuae."
 "Recent Advances in the Study of Entomology," Dr A. D. Imms.
 "Insects of Australia and New Zealand," P. Tillyard.
 "British Lepidoptera. Revised Edition" (2nd copy), E. Meyrick.
 "British Flies, Vol. VII," G. H. Verrall.
 "Practical Hints, 3 parts," J. W. Tutt.
 "British Mosquitoes," J. F. Marshall.

PROCEEDINGS, TRANSACTIONS, ANNUALS, REPORTS, Etc.

Bull. Soc. ent. France; Bull. Biologie et Medicin; Royal Irish Academy; Essex Naturalist; Bull. Lloyd Library, Chicago; Ent. Soc. Brit. Columbia; I. of W. Nat. Hist. Socy.; Soc. Ent. de la U.R.S.S.; Hastings and St Leonards Naturalist; Bull. O'Hara Inst.; Bull. Zoolog. Socy., Portici, Italy; Connecticut Acad. of Arts and Sciences; Norfolk and Norwich N.H. Socy.; Perthshire Socy. of Nat. Science; Socy. for Brit. Entomology (2 series); Herts. Nat. Hist. Socy.; Leicester Phil. Socy.; Hastings and E. Sussex N.H. Socy.; Upsala Zool. Socy.; Field Mus. of Chicago; Smithsonian Institute; Argentina Revista.

PERIODICALS (Exchange Mostly).

Tetschrift, Riga, Vol. 3, Embrik Strand; Naturalist; Entomologist; Ent. Mo. Mag. (purchase); Ent. Record and Jr. of Variation; Natural History, New York; Vasculum; Entomologists' Bull.; Ent. News (3 years number); Entomologische Beiheft (Dahlem).

SEPARATES.

List of Lepidoptera of Herts; United States Museum; Fossil Insects Handlirsch; Vienna Museum; Smithsonian Inst.; Muses Argentino; Irish Academy of Sc.; Ent. Soc. France; Sup. Ent. Saalskapet Lund Lapland; Dep. Biol. Shanghai Sci. Inst.; etc.

HON. TREASURER'S REPORT, 1938.

I shall not need to take up this year so much of your time as I did last, because this time there is no change in the form of the accounts.

Our investments remain the same, but their value is some £37 less, owing to the general fall in the value of gilt-edged stocks. The market value is still, however, more than the cost to the Society.

During the year I have transferred £50 from Current Account to Deposit Account so as to earn interest.

You will no longer find among the assets the £5 for the estimated value of subscriptions in arrear. The Balance Sheet looks better without it, and as we have had a good year we can afford to drop it. Had we clung to it the credit for subscriptions in the Income and Expenditure Account would, of course, have been £5 more.

On the liabilities side of the Balance Sheet you will find a new item, a provision of £5 towards Removal Expenses. It is expected that the Removal will take place in 1939.

Our income as shown by the Income and Expenditure Account is almost exactly the same as last year. The rise in Income Tax on the investments is offset by the increase in deposit interest, so that the net produce of our General Fund investments is also virtually unchanged.

The donations towards the Exhibition Expenses came to practically the same amount as last year. I take the opportunity of thanking those who so generously made the donations.

On the expenditure side there is the provision of £5 towards Removal Expenses, to which I have already referred. The Grant to the Publication Fund is £65, which is £2 less than last year. A Grant of £5 had to be made to the Library Fund because we have spent much more this time on books. Indeed, the recent additions made to the Library—by gifts and by purchase—make an impressive list. Otherwise the expenditure is much as usual and does not call for comment. The excess of Income over Expenditure is £2 16s 6d.

Entrance Fees have yielded £3 10s for the Capital Account. This is more than last year; in fact, it is necessary to go back to 1927 to find a higher figure. Two more members have become Life Members, and the £16 16s paid by them, together with the Entrance Fees, have been swallowed up in Library Expenses.

Turning to the Publication Fund, you will see that the donations have increased. I offer the Society's thanks to the donors. They have enabled me to make a lesser call on our income than last year. The printing and postage of the *Proceedings* cost us £80 7s 6d, almost the same as last year.

Lastly there is the Illustrations Fund, which provides the cost of making blocks and of printing illustrations. Once again we have to

thank our anonymous friend for a donation of £20. This is the third such donation we have had. Without this help we should have been in a sad plight.

Mr F. J. Coulson and Mr G. R. Sutton were appointed auditors on behalf of the Council and members respectively. They were kind enough to come out to Enfield to audit the books. I am greatly obliged to them for their courtesy in doing this and for their patience in going through the figures.

The printer's copy of the accounts is here for your inspection. I shall be happy to try to answer any questions either now or later.

Before I close I want to mention one point about bankers' orders. The form to be found at the end of the annual volume can be used by country members if they will alter the figure to 7s 6d and initial the alteration. Perhaps next year a form providing for their needs will be printed. I mention this because one member told me he thought country members were not included in the invitation I make to all members to adopt this method.

BALANCE SHEET at 31st December 1938.

Examined and found correct, 14th January 1939.

F. J. COULSON, Auditor.

GRESHAM R. SUTTON, Auditor.

NOTE.--The Society's Books, Cabinets, Collections, etc., are insured for £1000.

T. R. EAGLES, Hon. Treasurer.

INCOME AND EXPENDITURE ACCOUNT—Year to 31st December 1938.

Rent of Rooms ...	£50 0 0	Subscriptions (Arrears and Current) ...	£136 12 6
Insurance ...	1 11 0	Interest—	
Attendance ...	2 10 0	£154 14s 0d 4 % Consols ...	£6 3 8
Secretariat Expenses ...	13 13 3	£591 15s 3d 3½ % Conversion Loan ...	20 14 2
Treasurer's Expenses ...	3 9 9	Deposit Interest ...	1 3 1
	£71 4 0		
Subscriptions—			£28 0 11
South Eastern Union of Scientific Societies ...	£0 15 0	Income Tax ...	7 2 5
Commons, Open Spaces, and Footpaths Preservation Society ...	0 10 6	Exhibition Expenses (Donations (towards) ...	20 18 6
The Ramblers' Association (Southern Federation) ...	0 7 6		17 11 0
Exhibition Expenses ...	1 13 0		
New Attendance Book ...	23 0 0		
Grant to Library Fund ...	1 8 6		
Grant to Publication Fund ...	5 0 0		
Provision for Removal Expenses ...	65 0 0		
	5 0 0		
	£172 5 6		
Balance, being the Excess of Income over Expenditure carried to Balance Sheet ...	2 16 6		
	£175 2 0		£175 2 0

CAPITAL ACCOUNT—Year to 31st December 1938.

Transfer to Library Fund ...	£30 0 0	Balance at 1st January 1938	£991 5 10
Balance at 31st December 1938	991 11 10	Entrance Fees ...	3 10 0
		Life Members' Compositions ...	16 16 0
	£1011 11 10		£1011 11 10

LIBRARY FUND—Year to 31st December 1938.

Books purchased	...	...	...	£22 11 6	Balance at 1st January 1938	...	...	£1 12 8
Binding	...	...	...	1 13 6	Transfer from Capital Account	...	...	20 0 0
Subscriptions to Entomologist's Monthly Magazine	...	...	...	0 15 0	Transfer from Income and Expenditure Account	...	...	5 0 0
Balance at 31st December 1938	...	...	...	1 12 8				
				£26 12 8				£26 12 8

PUBLICATION FUND—Year to 31st December 1938.

Printing Proceedings	...	...	...	£77 10 0	Balance at 1st January 1938	...	...	£1 3 0
Postage of same	...	...	...	2 17 6	Transfer from Income and Expenditure Account	...	...	65 0 0
				£80 7 6	Interest on 3½% War Loan (Misses E. F. and L. M. Chapman)	£10 10s, less Income Tax, £2 12s 6d	...	7 17 6
Balance at 31st December 1938	...	...	...	2 7 4	Donations	...	...	4 9 0
					Sale of Proceedings	...	...	4 5 4
				£82 14 10				£82 14 10

ILLUSTRATIONS FUND—Year to 31st December 1938.

Blocks	...	...	...	£6 16 7	Balance at 1st January 1938	...	...	£18 16 7
Printing Illustrations	...	...	...	6 18 6	Donation	...	...	20 0 0
				£13 15 1				
Balance at 31st December 1938	...	...	...	25 1 6				
				£38 16 7				£38 16 7

ABSTRACT OF PROCEEDINGS.

10th FEBRUARY 1938.

MR F. S. STANLEY-SMITH, President, in the Chair.

Mr J. O. T. Howard exhibited *Ectropis bistortata*, Göze, a south of England melanic specimen (New Forest, 16.vii.1933), similar to that shown by Mr R. J. Collins, 13.i.38, and figured in our *Proceedings* for last year on Plate IV, with four other specimens for comparison—a melanic *bistortata* from Witherslack (10.iv.1936), a dark but not melanic *bistortata* from Surrey (Chiddingfold, 21.iii.1936), and two melanic *crepuscularia*, Hb., from Derbyshire (Repton, 26-27.v.1924), one showing an irregular patch of pale coloration on the left forewing.

Dr G. V. Bull exhibited a series of *Colotois (Himera) pennaria*, L., from Herts, Kent and Sussex, all showing the ordinary range of colour variation. An almost black chocolate-coloured *Omphalocelis lunosa*, Haw., with suffused hindwings and a pale *agrotoides*, Gn., form for comparison. The dark form of *lunosa* has since been designated as ab. *intensa*, Turn. (*Ent. Rec.*, L.22.1938).

Mr Priest exhibited examples of *Dasychira pudibunda*, L., which emerged without forcing on 25.xii.37, together with specimens of *Xylophasia polyodon*, L. (*monoglypha*, Hufn.).

Mr Dennis exhibited a photograph of the ovum of the Wood Cricket, *Nemobius sylvestris*, Fb.

Mr Attwood, on behalf of Mr O. J. Janson, exhibited some *Cicadidae* from the collection of the late Mr Bevis (?). He also showed another collection of *Cicadidae* formed by the late Mr Nickels of Benfleet, Essex, and read the following note:—" *Cicadidae* are usually looked upon as dull brown insects with transparent wings like those of our single British species, but a small, named and systematically arranged collection, recently acquired by me, from which a selection has been made in the box exhibited, shows that this is not so. *Platylomia saturata*, Wlkr., is most remarkable in structure. *Tosena melanoptera*, A. Wht., is black with white bands and another has a blue-green *Morpho*-like reflection. It has been said that all the transparent-winged species have these coloured reflections when alive; if so, this species has contrived to preserve its living colour."

Mr Attwood then exhibited two locusts from South America and two large beetle larvae, each about six inches in length. The larvae had been skinned, stuffed with sawdust, and sewn up. They were probably of some species of *Megasoma* (*Dynastidae*) and *Lamiidae*. He also exhibited a large beetle from the Argentine, identified as *Megasoma janus*, Felsche.

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Mr Hy. J. Turner called attention to the recent discovery (by Skat Hoffmeyer of Aarhus, Denmark) that the two figures labelled *Heliothis dipsacea*, L., on plate 19 in Vol. II of South's "Moths of the British Isles" do not represent that species, but an allied one, *H. maritima*, Gras., hitherto only reported from the S.W. area of France, more or less near the coast. (See *Trans.*)

A beautiful series of lantern slides, mainly of botanical objects, were shown by Mr H. C. Ward, accompanied by appropriate notes, and from the subsequent remarks and questions it was evident that much interest was aroused among the members present.

24th FEBRUARY 1938.

The PRESIDENT in the Chair.

Messrs F. J. Coulson, F. D. Coote and Mr W. J. Ferrier each presented a volume to the Library of the Society.

Mr Hugh Main exhibited two species of "fruit flies," *Drosophila funebris*, Fb., and *D. subobscura*, Fln., and made remarks upon their habits in captivity. He also showed several spiders and remarked on their economy.

Mr T. R. Eagles exhibited tests of the sea-urchins, *Echinus esculentus*, L., and of *Echinocardium cordatum*, Pnt. He also showed the Pyrenean Toothwort, *Lathraea clandestina*, L., parasitic on the roots of willow and willow.

Mr Hawkins exhibited larvae of *Dorcus parallelopipedus*, L. (Col.) taken in a tree stump at Wimbledon.

Mr S. R. Ashby exhibited specimens of the rare introduced Coleopteron, *Ptinus latro*, Fb., which had been presented to the Society's cabinet.

Dr Blair, on behalf of Mr N. A. Richardson, exhibited a specimen of *Chloroclystis rectangulata*, L., var. *nigrosericeata*, Haw., taken in his garden at Hendon. The specimen, a ♂, was of unusual interest in that the genitalia were very fully displayed, the white valves being exposed for their whole length beyond the black apex of the body, with the long slender uncus reflexed forwards over the dorsum of the abdomen, the whole surrounded by a beautiful display of long white hairs. Normally one can see at most the tips of the valves at the apex of the body, and the armature does not agree with Peirce's description and figure ("Genit. Brit. Geom.") as he says that there is no uncus. Curiously enough, the only specimen we have seen that at all resembles this is the type of Haworth's variety in the British Museum. In this the valves are fully exposed but closed together, so that no uncus can be seen, and there are none of the long white hairs (*coremata*?). This suggested the possibility of two species, very similar in appearance but with different genitalia, being confused under one name, so the specimen was shown to Mr Prout, but is pronounced by him to be only the black form of *C. rectangulata*, L.

Mr Hy. J. Turner exhibited a few Pyrales from India, collected by our fellow-member, Mr Sevastopulo. They were all Pyraustinae except the two species, *Cirrhochrista brizoalis*, Wlkr., and *Bradina admixtalis*, Wlkr., which belong to the *Schoenobiinae* and the *Hydrocampinae*, respectively. There were 3 species of the large genus *Glyphodes* to which our *G. unionalis*, Hb., belongs. Other species of *Glyphodes* were shown, in one of which, *G. sinuata*, Fb., from Africa, the fore legs have a curiously swollen and black-scaled basal segment of the tarsus.

Mr Finnigan exhibited a large number of Natural History slides in the lantern and made appropriate remarks on them, most of the slides being of entomological interest. The selection of the subject and the execution of the photography were both excellent.

10th MARCH 1938.

The PRESIDENT in the Chair.

It was announced that the Council had selected Mr F. D. Coote and Mr E. E. Symms as Assistant Secretaries to arrange the programmes for the Society's Field Meetings and Indoor Meetings respectively.

The following were elected members:—Miss M. Burton, 212 Golders Green Road; Mr O. C. Davies, 33 Hopton Road, Streatham, S.W.12; Mr D. H. Sterling, 91 Calbourne Road, Balham, S.W.12; Mr F. W. Pollard, "Ampney," St John's Avenue, Brentwood; Mr B. P. Beirne, 4 Tobernea Terrace, Monkstown, Co. Dublin; Mr W. Buckley, F.R.E.S., 5 Westfield Road, Cheadle Hulme, Cheshire.

Dr G. V. Bull exhibited larvae of *Callimorpha quadripunctaria*, Poda (*hera*, L.) from Bovey Tracey, and reported *Taeniocampa munda*, Esp., *Biston strataria*, Hufn. and *Ectropis crepuscularia*, Hb. occurring on 9th March, and *Eupithecia abbreviata*, Steph. on 6th March.

Mr Hy. J. Turner exhibited living ♂ and ♀ of *Poecilopsis pomonaria*, Hb., a northern Continental species nearly related to our Scottish *P. lapponaria*, Bdv. This species has been much used in hybridisation experiments with allied species.

Mr M. Niblett exhibited the following *Trypetidae*:—*Ceriocera* (*Trypeta*) *microceras*, Her., bred from stems of *Centaurea scabiosa*, L. This species was discovered independently by Dr Hering of Berlin and Mr G. C. Varley of Cambridge, and was described by the former in 1936. Mr Varley bred it from stems of its host plant taken at the Devil's Ditch near Newmarket, and Mr J. C. Collin swept several specimens from the same locality. The specimens shown were bred from stems of the plant taken at Woodmansterne and Epsom Downs, Surrey, the flies emerging in July. This was believed to be the only other record for this country. Enclosed for comparison were specimens of the closely allied species, *Ceriocera* (*Trypeta*) *ceratocera*, Hend. (*cornuta*, F.), the larvae of which occur fairly frequently in the flower-heads of *Centaurea scabiosa*, L. This fly usually emerges in June.

Mr Eagles exhibited males, females and larvae of *Dorcus parallelipipedus*, L. (Col.); the Butcher's Broom, *Ruscus aculeatus*, L., with fruits, and flowers of both sexes; and the woody (oak) fungi, *Daedalea quercina*, Pers., and *Trametes gibbosa*, Fr., often productive of Coleoptera. Also the fungus, *Trogia crispa*, Fr.

Mr Ridley (a visitor) exhibited coloured cinematograph films made by himself: (1) The Life-history of *Papilio machaon*, L. (2) Some of our less known British Birds and their Nests. These pictures were much appreciated by the members present.

24th MARCH 1938.

The PRESIDENT in the Chair.

Mr S. N. A. Jacobs exhibited examples of the recently described Lepidopterous species, *Mnesipatris flicivora*, Meyr., bred from larvae received in October 1937 from Monkstown, Co. Dublin. Meyrick had placed it in the Family *Lampronidae*, while Pierce, from his investigation of the structure, places the species in *Teichobia* (Family *Psychidae*).

Mr A. Bliss exhibited a Lasiocampid larva found in a box of S. African grapes at Covent Garden Market.

Mr T. R. Eagles exhibited the living larva of *Aplecta nebulosa*, Hufn. from Enfield.

Mr R. J. Collins exhibited a specimen of *Chimabache fagella*, Fb., taken on a tree-trunk on Reigate Hill. The R. fore and hindwings were the normal light form; the L. forewing was the dark form and shaped almost as in the female, while the L. hindwing was slightly smaller. Both the antennae, when viewed with a lens, appeared to be male.

Mr Howard exhibited a living larva of *Aplecta tineta*, Brahm, taken at night at Esher, 19.iii.38.

Mr Buckstone exhibited a specimen of *Polyommatus semiargus*, Rott. (*acis*, Ochs.) given to him some 40 years ago.

Mr L. W. Newman then gave a very interesting and amusing account of his entomological experiences during the past forty years. A very hearty appreciation of Mr Newman's remarks was shown by the full meeting present.

14th APRIL 1938.

The PRESIDENT in the Chair.

Mr H. W. Andrews exhibited typical examples of British and Exotic *Cyrtidae* (Dip.) to illustrate his paper on this group. (See *Trans.*)

Mr Eagles exhibited living larvae of *Noctua triangulum*, Hufn. and of *Eretia buoliana*, Schiff. and galls on *Quercus aegilops*, L. from Greece.

Mr D. W. Royffe exhibited Coleoptera taken at the Society's field meeting at Bookham Common, 2nd April, including:—*Abax ater*, Sc.,

Agonum obscurum, Hb., (*oblongum*, F.), *Coccinella 11-punctata*, L., *Exochomus 4-pustulatus*, L., *Omosita discoidea*, F., *Lochmaea crataegi*, Frst., *Chalcoides fulvicornis*, F., *Rhynchites aeneovirens*, Mur., *R. interpunctatus*, S., *Sitona tibialis*, Hb., *Bagous nigrirarsis*, Th., *Anthonomus pedicularius*, L. and *Orchestes stigma*, Gm.

Col. P. A. Cardew exhibited a short series of bred *Epione vespertaria*, Fab. (*parallelaria*, Schiff.) to show the variation.

Mr F. D. Coote exhibited series of *Erannis* (*Hybernia*) *leucophearia*, Schiff. and of *E. (H.) marginaria*, Fb. taken this year mostly at Epsom and Ashtead.

Mr S. Wakely exhibited larvae and cases of *Coleophora genistae*, Sta. from Beckham and a larva of *Pseudoterpna pruinata*, Hufn. from Broadwater Forest.

Dr G. V. Bull exhibited galls on the stems of white *Jasminum officinale*. He then reported the following examples of early flowering:—Oak, 29th March; Bluebell and Early Purple Orchid, 4th April; Bugle, 7th April; Hawthorn, 13th April, all in West Kent. He also reported the earliest appearance of the following species of Lepidoptera comparing the dates with the earliest dates he had recorded during the past fifteen years: *Pieris napi*, L., 10.iv.38, previous date 12.iv.33; *Hesperia* (*Syrichthus*) *malcae*, L., 10.iv.38, previous date 15.iv.23; *Lycaenopsis argiolus*, L., 10.v.38, previous date 12.iv.23; *Anarta myrtilli*, L., 10.iv.38, previous date 8.v.28; *Ematurga atomaria*, L., 10.iv.38, previous date, 16.iv.33; *Eupithecia nanata*, Hb., 10.iv.38, previous date 19.iv.28; *Hemerophila abruptaria*, Thnbg., 27.iii.38, previous date 11.iv.33; *Cosymbia pendularia*, Clrek., 10.iv.38, previous date 27.iv.29; *Ectropis punctulata*, Schiff., 10.iv.38, previous date 10.iv.33.

Mr Priest reported that during the month of March of this year he had bred the following Lepidoptera:—*Saturnia carpini*, Schiff.; *Amorpha* (*Smerinthus*) *populi*, L.; *Tyria* (*Hypocrita*) *jacobaeae*, L.; *Dasychira pudibunda*, L.; *Pheosia tremula*, Clk. (*dictaea*, L.); *Notodonta ziczac*, L.; *N. dromedarius*, L.; *Lycia* (*Biston*) *hirtaria*, Clrek.; *Cosymbia orbicularia*, Hb.; *Abrostola tripartita*, Hufn. (*urticae*, Hb.), etc.

Mr H. W. Andrews read a paper on the Dipterous Family, *Cyrtidae*. (See *Trans.*)

28th APRIL 1938.

The PRESIDENT in the Chair.

Mr M. Niblett exhibited the following species of *Cynipidae*: *Liposthenes latreillei*, Kief., *Isocolus rogerhoferi*, Watchl., *Andricus seminationis*, Adl., and *A. albopunctata*, Schl.

Mr Hy. J. Turner exhibited, on behalf of Mr Sevastopulo, the very common Indian Arctiid, *Diacrisia obliqua*, Wlkr., consisting of a short series of two of the fourteen recorded and named forms, which had been bred from ova laid by a captured female. They were the typical form and the form *dahlbergiae*, Mr. A preserved larva was also shown. Very

little is known of the life-history and structure of this most variable species.

Mr F. D. Coote exhibited *Monima (Taeniocampa) stabilis*, View., the left side being of a grey tint, while the right side was reddish. Taken during the Field Meeting at Effingham, 20.iii.38.

Mr Dennis exhibited the "Mouse-tail," *Myosurus minimus*, L. (Ranunculaceae) from White Colne, Essex.

Mr F. D. Buck exhibited two tins of cocoa that were left in a cupboard from November last year until March this year, and were then found to contain a considerable quantity of the Beetles exhibited, the larvae of which were also present. The tins of cocoa were by different makers and neither of the lids had been left off for more than the few minutes necessary to make cocoa. The tins were never used at the same time and consequently the Beetle must have found its own way in, or entered the tins at different times during the short period in which they were in use. The exhibits consisted of living Beetles, Larvae (dead), a cell in which they pupate, and one of the cocoa tins in much the same condition as when the beetles were first discovered. They were identified as *Stegobium paniceum*, L.

Mr Howard called attention to the early (first in English) mention of collecting insects at light, by William Curtis in his handbook, "Instructions for Collecting and Preserving Insects; particularly Moths and Butterflies," 1771. The author quoted from Geoffroy "Histoire abrégée des Insectes qui se trouvent aux Environs de Paris," 1762.

Mr Mansbridge exhibited six specimens of *Peronea logiana*, Schiff. (*niveana*, Fb.) and a pair of *Eucosma nitidulana*, Zell., all of which he was presenting to the Society's collections. The former series consisted of 3 typical and 3 of the form *tripunctana*, Hb.

The Baron de Worms and Mr Ennis read papers on "Insects at Light." A considerable discussion took place. (See *Trans.*)

12th MAY 1938.

The PRESIDENT in the Chair.

Mr H. W. Andrews exhibited the Dipteron, *Pterodondia flavipes*, Gray (*Cyrtidae*).

Mr M. Niblett exhibited the following species of *Trypetidae* (Dip.): *Ceratitis capitata*, Wied.; *Rhagoletis alternata*, Fall.; *Phagocarpus permundus*, Hor.; *Gonioglossum wiedemanni*, Mg., with the parasitic Braconid, *Opius testaceus*, Nees.

Mr Sterling exhibited the larvae of *Eutricha (Lasiocampa) quercifolia*, L., taken on Mitcham Common, Surrey. They were some of eleven specimens obtained by him from this locality. Over 30 have been taken there this year. One of those exhibited was well mottled with white on the back. This form is mentioned by South, who says it occurs more commonly on trees, which are covered with grey lichen. About half of

the larvae were taken, by beating sloes, before hibernation, the rest by feeling up the thick stems in spring, or searching at night. Very few have been parasitised. He also exhibited a larva of *Bourmia lichenaria*, Hufn., beaten from an oak at the Elstead Field Meeting.

Dr K. G. Blair exhibited larvae of *Lithosia complana*, L. taken at the Field Meeting at Oxshott.

Dr Blair then exhibited examples of the Fluted Scale and read the following notes:—The Fluted Scale, *Icerya purchasi*, Maskell, collected by Mr Wallis Norton on a Mimosa growing in the open at Stratford-on-Avon. The first record of this Coccid in Britain is that by E. E. Green in 1926 ("Ent. Mo. Mag.," 62, p. 172). On this occasion it occurred on *Pittosporum* in Derbyshire, and was supposed to have come in with plants from France. In 1931 Mr Green gives a further record, this time on *Acacia* in Cheshire, and other occurrences have been reported since. It attacks a great variety of plants, including Orange, Lemon, Cypress, Pine, Rose and grasses, in addition to those named above, and where it establishes itself may cause immense destruction. In view of this possibility every effort is being made in this country to prevent it getting a hold, and the insect is scheduled as a pest notifiable to the Ministry of Agriculture whenever it is found. Apart, however, from the fact of its occurrence in this country this Scale is of considerable historic interest as being the first subject of attempts at control, both artificial, by means of fumigation, and biological, by the introduction and encouragement of its natural enemies, experiments in which have changed the whole practice of biological control as now employed by economic entomologists. The species was described in 1878 from specimens from Auckland, New Zealand, where it was found in great numbers on a hedge of Kangaroo Acacia introduced from Australia, but 10 years before this it was recognised as a serious pest in the orange groves of California, and the Australian Ladybird, *Rodolia cardinalis*, Muls., was introduced to try to keep it in check. The Ladybird thrived and was evidently a formidable check upon its increase, but was unable to suppress it, and fumigation methods were adopted in addition. The combination of both methods is hard put to it to keep the Scale under control. Similarly, in the Mediterranean region, the insect has of late years become an exceedingly destructive pest, and various methods of control are employed against it. Here another Ladybird, *Cryptolaemus montrouzieri*, Muls., which has a more rapid rate of reproduction than the *Rodolia*, finds more favour. For the identification of the insect and the above details in respect to it I am indebted to Mr F. Laing, of the British Museum.

Dr E. A. Cockayne exhibited the following aberrations of British Lepidoptera:—*Cleora jubata*, Thnbg. (*glabraria*, Hb.), ab. *obscura*, Fuchs; *Ectropis crepuscularia*, Hb., mosaic form dominant to type, but recessive to ab. *delamerensis*, B. Wht.; *Ectropis bistortata*, Gze., melanic, N. Forest; *Catocalpe undulata*, L., with blackened median area; *Cidaria fulvata*, Först., with narrow broken median band; *Xanthorhoe*

fluctuata, L., ab. *costovata*, Haw.; *X. montanata*, Schiff., ab. *costimaculata*, Rbl.; *Epirrhoë tristata*, L., dots between median and marginal areas forming lines; *Ematurga atomaria*, L., ♂, Lake district, ? ab. *unimarginata*, Cornels, one with submarginal band missing, and others; *Panolis flammea*, Schiff. (*piniperda*, Losch.: *griseo-variegata*, Gze.), orbicular and reniform formed by broad white streaking; *Abraxas grossulariata*, L., one with broad black median band on forewing and hindwing with broad black inner line and outer line formed of big black streaks, the two lines partly united. Sunderland.

Dr G. V. Bull exhibited larvae of *Cosmia* (*Xanthia*) *paleacea*, Esp., and *Calocampa solidaginis*, Hb., bred from Aviemore ova. He reported *Pararge megera*, L., on 5th May, the earliest date for West Kent for 17 years, and *Brenthis euphrosyne*, L., on 6th May, only two earlier dates in 17 years.

Mr Wallis Norton exhibited the Dipteron, *Ctenophora flaveolata*, Fb. (*Tipulidae*.)

Mr Howard exhibited larvae of *Lasiocampa quercus*, L.; *Mormomaura*, L., and of *Crocallis elinguaris*, L.

Mr A. Bliss reported that fifteen species of *Rhopalocera* had already been seen on the wing in Dorset by Mr Glanville-White.

Mr M. Niblett read a short paper, "The Mediterranean Fruit-fly." A considerable discussion ensued. (See *Trans.*)

26th MAY 1938.

The PRESIDENT in the Chair.

Mr B. B. Snell of Bromborough, Cheshire, was elected a member.

The evening's programme was an exhibition of living objects.

Living larvae were shown by Messrs T. R. Eagles, S. Wakely, D. W. Royffe, R. W. Attwood, F. D. Coote, W. H. A. Harris, B. S. Goodban, S. W. C. Williams, Baron de Worms, etc.; ova by Mr V. E. August.

Mr S. N. A. Jacobs exhibited ticks found on a tortoise from French Morocco.

Col. P. A. Cardew exhibited an Indian species of Lycaenidae, *Rapala schistacea*, M., taken with others some years ago in Savernake Forest.

Miss W. M. A. Brooke exhibited the pupa of a large moth (species not known), a remarkable spider's nest, and the thick solid operculum of the shell of a large snail, all from S. Africa.

Mr Turner exhibited a long series of the Noctuid, *Triphaena comes*, Hb., and pointed out the variation.

9th JUNE 1938.

Mr F. J. COULSON, Vice-President, in the Chair.

Mr Dennis exhibited a photograph of the ovum of *Leptidea sinapis*, L.

Mr J. O. T. Howard exhibited series of *Biston hirtaria*, L., and

Monima (Taeniocampa) gracilis, Fb., from Scotland. The latter contained a selection of dark forms including some very fine reddish specimens.

Dr K. G. Blair exhibited larvae of *Coleophora crocogramma*, Meyr. (1928) (= *crocogrammos*, Zell. (1846) = *lincolea*, Haw. (1828)) on *Stachys lanata*, a garden plant, and a living specimen of the Rose Chafer, *Cetonia aurata*, L., from Godalming.

Mr H. W. Andrews exhibited a ♀ of the large Ichneumon, *Rhyssa persuasoria*, L., parasitic on the giant wood-wasp, *Sirex gigas*, L., a specimen of which was also exhibited.

Mr Pollard exhibited, for comparison with the last exhibit, an example of *Rhyssa curvipes*, Grav., a somewhat smaller species of the same genus.

Mr Stephens exhibited further species of Coleoptera from the Chatham district.

Mr H. Moore read the following note on the Australian Bull-dog Ant, *Myrmecia nigriventris*, Fb.: "Taking advantage of the kindness of a mutual friend returning to Melbourne, I said I would like specimens of the Bull-dog Ant. I have recently received the couple I now exhibit. Any account of up-country life in Australia is pretty sure to mention it, giving one the impression of a single species. That is not so. Different species are found in different parts, but the present one seems to be the most formidable of the whole tribe. It is very tough. Considerable force is required to drive the pin through the thorax. I turned the points of two, and bent another in vainly trying to guide it the way it should go, and had to be satisfied with where it went. It appears to be no joke to be the object of their attentions. They make themselves unpleasant at both ends, unwilling to relax their jaws when they bite, and ever ready with their $\frac{1}{4}$ -inch sting. When in the country, people are careful where they sit."

Mr Hy. J. Turner exhibited a series of an African Nymphalid, the beautiful *Hypolimnas salmacis*, Dry. from the Cameroons, including the f. *montierionis*, Auriv. without the apical spots, the ab. *cissalma*, Suff. in which the oblique discal band is blue not white, and the two forms of the ♀, the one resembling the ♂, the other with the blue coloration on the forewing replaced by yellowish or greyish-white.

Mr J. L. Atkinson exhibited a bred example of *Cupido minimus*, Fuess. The larva was taken at Dover, 16.vii.37.

Mr Wallis Norton then gave an account of his experiment of killing insects by total immersion in pure petrol (Aviation Spirit). "I started the experiment as a result of Newman's advice to kill 'Zygaenidae' in this manner. It appeared to me that if such a method was so lethal to insects with such a strong tenacity of life it might be employed for any other insect. It also appeared to me that it might be useful for dealing with insects, particularly the 'greens' and the 'pinks' which are so liable to bleach, and possibly also those which are liable to go 'greasy.' I was in some doubt as to the effects on very hairy insects, anticipating

possible matting of the hairs, but found this not to be the case. I thought it well therefore to bring to the notice of the Society the result of my experiments and to exhibit, in confirmation of my statements, several insects which had been submitted to total immersion in petrol. The procedure is to use a wine glass large enough to take the insect and to put in sufficient petrol to ensure completely covering it. The insect is then shaken into the glass and allowed to remain totally submerged for about a couple of minutes. Then it should be removed with a pair of forceps by the feet and dabbed gently on a piece of clean blotting-paper to remove the surplus moisture and then left to dry, feet down if possible, on the blotting-paper until its colour returns. The insect, while immersed, becomes very nearly transparent. As soon as the colour returns set immediately as it will stiffen fairly quickly. I would advise anyone caring to try this method to start off with Noctuids, as the strong main wing nervures will prevent the wings folding up on being removed from the liquid. Geometers should slip out at an angle very slowly. Very little practice is needed to ensure success."

Mr S. Wakely exhibited larvae of *Odontosia carmelita*, Esp. from Stoke Row, Oxfordshire, sent by Mr Rudland, who was lucky enough to obtain a female which produced a fine lot of fertile ova. Also a twig of Sallow from Bookham, Surrey, showing swelling caused by the Coleopteron, *Saperda populnea*, L., which was also exhibited. Larva and pupae of *Melitaea athalia*, Rott., bred from ova, the larvae wintering and feeding on Foxglove; the ♀ parent being captured in S.E. Essex. Larvae of *Depressaria nervosa*, Haw., found on *Oenanthe crocata*, L., in the Isle of Wight. Larvae and pupae of *Alucita spilodactyla*, Curt. on *Marrubium vulgare*, L. from Freshwater, Isle of Wight. Larvae of *Coleophora vibicella*, Hübn. on *Genista tinctoria*, L. from Gurnard, Isle of Wight.

Preliminary Reports of the Field Meetings made in March, April and May were submitted by their respective leaders.

23rd JUNE 1938.

The PRESIDENT in the Chair.

Dr Blair exhibited the Dipteron, *Laphria gilva*, Fab., taken by Mrs Blair during the Ascot Field Meeting. This species had not previously been taken in Britain.

Mr Turner exhibited several species of the Nymphalid genus, *Catagramma*, Hew. All the species of this genus are extraordinarily brilliant in coloration and are all confined to South and Central America.

Mr O. C. Davies exhibited living larvae of *Lithosia deplana*, Esp. and of *Boarmia ribeata*, Clrek. (*abietaria*, Schiff.) from Box Hill; and of *Leucoma salicis*, L. from Hackney Marshes.

Mr T. R. Eagles exhibited living larvae of *Ennomos erosaria*, Schiff., of *Biston strataria*, Hufn. and of *Lobophora (Nothopteryx) carpinata*, Bork.

Mr Denvil exhibited a series of *Rhagium bifasciatum*, Fab. (Col.) taken in a decaying birch tree at Oxshott and living specimens of *Cryptocephalus hypochaeridis*, L. (Col.) found in flowers of Rough Hawkbit (*Leontodon hirtus*, L.) at Coulsdon.

Mr Hutchings then read a paper on "British Orchids" and exhibited several species preserved in spirit and also many excellent photographs, kindly furnished by Mr Dennis, to illustrate his remarks. (See *Trans.*)

14th JULY 1938.

The PRESIDENT in the Chair.

Mr Denvil exhibited a pupa and a living imago of *Melasoma populi*, Knoch (Col.) and a number of small Diptera together with a shell of *Helix pomatia*, L. from which they had emerged.

Dr K. G. Blair exhibited the Braconid, *Polemone liparæ*, Gir., bred from galls of *Lipara lucens*, collected in Wicken Fen in June. The only previous breeding record of this parasite in this country appears to be that of J. C. Dale ("Ent. Mo. Mag.," 1893, p. 115) of a specimen sent to his father in 1861. The insect appears to be rare, as it was not represented in the British Museum collection, though Morley ("Entom.," 1924, p. 255) records a few captures. Also living specimens of the Dryinid, *Dicondylus bicolor*, Hal., bred from nymphs of the Homopteron, *Stiroma albomarginata*, Curt. The larva lives as an ectoparasite on the host and is visible as a black sac. When fully grown this sac is enclosed in two coats of similar structure split down the middle like the shells of a bivalve mollusc. The larva then escapes by a similar split and spins a white cocoon, in this case on the cork of the glass tube in which they were kept. Whether the black wrappings are successive cast skins, and perhaps the egg-shell of the larva, or whether they are secretory coats formed by the larva, was not known to the exhibitor but, if the former, then the earlier larval stages had a form very different from that of the escaping larva, which was of normal Hymenopterous type, with soft white plainly segmented body, and a distinct head.

Mr A. W. Dennis exhibited a photo of the ovum of *Strymon w-album*, L.

Reports of several recent Field Meetings were read: Cut Mill, 8.v.38, by Mr F. Stanley-Smith; Box Hill, 18.vi.38, by Mr S. Wakely; Forest Row, 26.vi.38, by Mr H. G. Denvil; South Benfleet, 10.vii.38, by Mr R. W. Attwood; Chalfont and Latimer, 10.vii.38, by Dr K. G. Blair.

28th JULY 1938.

The PRESIDENT in the Chair.

Mr John Burton, "Newlands," 212 Golders Green Road, London, N.W.11, and Mr W. R. Sherrin, A.L.S., F.Z.S., 323 Norwood Road, S.E.24, were elected members.

Mr S. N. A. Jacobs exhibited examples of the Micro-lepidopteron, *Bucculatrix ulmella*, Mann. in illustration of the paper subsequently read by him.

Mr C. N. Hawkins exhibited specimens of *Stauropus fagi*, L. and of *Drymonia trimacula*, Esp., both bred from larvae taken at the Byfleet Field Meeting last year, and an example of *Aegeria apiformis*, Clerck, bred from a pupa taken at Effingham.

Mr Hy. J. Turner exhibited specimens of two South American Nymphalids from Ecuador, both of which had a considerable amount of brilliant silver coloration on the undersides. *Dione moneta*, Hb. is spread over most parts of S. America, *D. junio*, Cr. occurs commonly from Mexico to the Argentine. The larvae feed upon species of the "passion flower."

Mr S. Wakely exhibited photographs, taken by Mr Bunnett, of the ova and larvae (in various stages) of *Endromis (Dimorpha) versicolora*, L.

Dr H. B. Williams exhibited a varied series of *Lophopteryx camelina*, L.

Mr A. Bliss exhibited larvae of *Anagoga (Numeria) pulveraria*, L. from ova laid by a female taken at Crowcombe, Somerset.

Mr W. H. A. Harris exhibited larvae of *Chlorissa (Nemoria) viridata*, L. and of *Sterrhia (Acidalia) subsericeata*, Haw. from the New Forest, and larvae of *Callimorpha dominula*, L. from Breamoor.

Mr Attwood exhibited a larva of *Cucullia chamomillae*, Schiff. from Riddlesdown, Surrey, 24.vii.38.

Mr F. D. Coote exhibited (1) *Stilpnolia salicis*, L. From a batch of nearly full grown larvae collected in the Lea Bridge Road, Clapton, he obtained about two dozen imagines, all emerging within 3 days. During the next two days three Diptera, subsequently identified as *Compsilura concinnata*, Mg., appeared in the cage. [This Tachinid is a well known parasite of *S. salicis*, and is one of our commonest Tachinidae; attacking a large number of Lepidopterous larvae.—K.G.B.]

(2) *Abraxas sylvata*, Scop. From several females taken at the Chalfont Road Field Meeting, batches of about 30 ova were obtained, some of which had hatched that morning, while other batches have changed colour preparatory to hatching.

(3) *Melitaea athalia*, Rott. At Hadleigh Woods on the 20th inst. this butterfly was found fairly plentiful and in practically bred condition. There were no worn specimens. Two females, slightly chipped, were placed in a cage. By the next day the cow-wheat that had been taken home had shrivelled but one batch of ova was deposited. The next day some plantain was placed in the cage with the dead cow-wheat. By this time one female had died but the other laid eggs on the plantain. A lot of eggs were found loose at the bottom of the cage. They do not seem to adhere very well to the plantain. By Saturday evening last the second female had died and the cage was then cleaned out. On Sunday evening the third female was placed in the cage with some fresh plantain and the next day some fresh cow-wheat was placed in the cage.

During Wednesday this female laid a batch of ova on the plantain but none on the cow-wheat. The cage was left out in the open and was flooded by rain and the *athalia* drowned.

(4) *Loxostege palealis*, Schiff. This local insect occurs in the rough ground by the railway sidings at Benfleet. At each Field Meeting of recent years there I have found one specimen only. On the 20th inst. I took another and subsequently found the batch of ova laid on the glass on the pill box and hope they will prove to be *palealis*.

(5) *Pararge aegeria*, L. From ova laid by the females taken at Chiddingfold larvae of varying sizes and one pupa were exhibited.

Mr S. N. A. Jacobs then read his translation of an interesting paper on the genus *Bucculatrix*, Zell. by Herr J. Klimesch (published in *Lam-billionea*). (See *Trans.*)

11th AUGUST 1938.

The PRESIDENT in the Chair.

Mr Royffe exhibited living larvae and imagines and a series of *Tenebrio obscurus*, Fb. and of *T. molitor*, L. (Col.) from a stable at Surbiton.

Mr J. O. T. Howard exhibited living larvae of *Heliothis* (*Chloridia*) *peltigera*, Schiff. from Dungeness. He also made the following remarks on the neon lights as an attraction to insects: "On 24th July 1938 Mr and Mrs Cole and I went down to a wood near Havant for an evening's collecting (*Noctua baja*, Fb. and *Dyschorista suspecta*, Hb. were the most interesting insects taken). Driving home along the Portsmouth Road at about 3 a.m., we came to an all-night café in the village of Ripley, where we decided to revive our flagging spirits with coffee. This café had a glass panelled door, on each side of which was a plate glass window with a neon sign. On one side the sign consisted of the word milk in red, on the other there was a cow's head outlined in blue. There were a large number of moths inside the café, and it was very noticeable how much they preferred the 'cow' to the 'milk.' There were not more than a dozen all sitting quietly around the red light, while the blue had quite four times as many. Some sitting about, some crawling over the glass, and a lot flying around and around. I am afraid we were somewhat jaded, and so took no careful note of the species present, but I do remember two or three *Arctia caja*, L., a lot of *Lithosia lurideola*, Zinck., and two very fresh *Laphygma exigua*, Hb., which were the first I had ever seen alive. It should be remembered that the café faced directly on to the main road, with houses opposite, so that it was by no means an ideal situation for light, but the two-coloured signs had an absolutely equal chance, any moth entering the door having a free choice of turning right or left to blue or red. I believe the blue sign is not neon, but if desirable the gas could easily be ascertained, and the wave lengths of each must be well known. By

the way, very few moths had penetrated further into the ordinary electric bulbs, though there were a few in the bowls just under the lamps."

Mr Denvil exhibited the pupa and imago of *Melasma populi*, L. (Col.) and a number of small Diptera (living) together with an apparently empty shell of *Helix pomatia*, L., from which they had emerged. Subsequently Mr H. W. Andrews stated that the flies were *Discomyza incurva*, Flin.

Reports of the Field Meetings held during June and July were then read.

25th AUGUST 1938.

Mr F. J. COULSON, Vice-President, in the Chair.

Dr H. B. Williams exhibited a larva of *Stauropus fagi*, L., bred from an ovum obtained from a female taken at Dunsfold in the spring, and specimens of *Angerona prunaria*, L., including a form in which the apex and a portion of the hind margin had a deep narrow black clouding.

Mr B. A. Cooper exhibited a living larva of *Manduca (Acherontia) atropos*, L. from Norwich.

Mr August exhibited ova and young larvae of *Apatura iris*, L.

Mr Denvil exhibited a living example of the Great Grasshopper, *Tettigonia viridissima*, L.

Mr Hy. J. Turner exhibited a case containing series of *Zygaena transalpina*, Esp. from various Continental S. Alpine localities, and a series of the very variable *Z. ephialtes*, L., also from areas South of the Alps.

Dr Bull exhibited a *Malacosoma castrensis*, L., with the bars on the forewings absent, the hindwings being slightly crippled. N. Kent.

Mr Deal exhibited a pupa of *Aglais urticae*, L. and the Chalcid parasite, *Pteromalus puparum*, L., which had emerged from it.

Dr E. A. Cockayne communicated the following note on *Synanthedon flaviventris*, Stdgr.: In 1938 galls of *Synanthedon flaviventris*, Stdgr. were very common in some parts of Surrey, though scarce in others. In previous years I have found that the great majority of the galls have been pecked open by birds, probably tits, during the winter and very few remain intact in the spring. On 20th and 27th February I took friends to show them how to find galls and was surprised to see that not a single gall had been attacked, though more than two hundred were found. The few seen at our Field Meetings at Effingham and Bookham (2nd April) were also untouched by the tits. I kept 80, hoping that from galls gathered so late a higher percentage of moths than usual would emerge. The first moth emerged on 14th May before I was expecting it and escaped, and I bred only 7 more. Examining the remaining galls I found 8 dead pupae, 5 dead larvae, 7 cocoons of parasites, 8 galls with a normal boring, but no trace of a larva, alive or dead, and 44 galls with no central boring. Two of the 44 galls were very small, but the rest were large and well formed. There was a boring part of the

way round the stem, in some cases reaching the centre, but in no case was there a boring up the centre of the stem. In other years I have had a few such galls, usually very small ones, but I have never found more than one or two big ones without a central boring. As it is probable that birds do not peck open galls unless there is a larva inside, the unusual number of untenanted galls this year may account for their immunity from attack.

Dr K. G. Blair exhibited (1) a specimen of the Braconid, *Helcon ruspator*, L., ♀, taken at the Forest Row Field Meeting on 26th June last. The species was first recorded as British by Mr Donisthorpe, who exhibited at a meeting of the Entomological Society on 19th October 1910 a specimen taken by him from a cell of the beetle, *Strangalia quadrifasciata*, L., at Cannock Chase. A second example from the same locality was bred from a Longicorn larva by Mr H. W. Daltry and is now in Mr H. Britten's collection. (2) A blown larva of *Chilo phragmitellus*, Hb. from a stem of reed, taken at the Benfleet Field Meeting on 10th July.

Mr Syms exhibited a living specimen of *Melasoma aenea*, L. (Col.).

Mr Hutchings exhibited a ♀ specimen of *Colias croceus*, Frer., form *helice*, Hb., taken at Ewell.

Remarks were communicated on the season.

Mr S. Wakely then read his paper, "Some Interesting Micro-lepidoptera," and exhibited a case of specimens of most of the species to which he referred. (See *Trans.*)

8th SEPTEMBER 1938.

Mr F. J. COULSON, VICE-PRESIDENT, in the Chair.

Mr B. A. Cooper exhibited living larvae and various forms of the imago of *Hemerophila abruptaria*, Thnbg., and communicated the following note:—"In May 1937, at Kensal Rise, London, N.W.10, two melanic female *Hemerophila abruptaria*, Thnbg., were found mated with light males. The greater number of the resultant larvae were given away, but I had 112 imagines emerge in 1938. These were at once seen to be of two forms, occurring equally among both light and dark types. Eighty-six were of the normal type, in which the light central band of the upper wing has a breadth equal to about a quarter the length of the anal margin of that wing. The remaining twenty-six had the width of the band about a sixth to an eighth this length, giving the insect a noticeably different appearance, heightened by the fact that in these specimens (or at any rate in the light form) the whole wing tended to be narrower and more pointed at the apex. Both forms are of much about the same size and equally conspicuously marked. I cannot say whether the narrow banded form occurred as the offspring of one or both parents. In two extreme forms, both sides of this central band touch, the band then having a shape exactly like that of *Boarmia rhomboidaria*,

Schiff. (*gemmaria*, Brhm.). This might suggest that the narrower banded form was a reversion to an older type more closely related to the other species. Another specimen had two wings unlike, the left wing having the two sides of the band touching (as in some *gemmaria*), the right wing being of the usual narrow banded form (as in other *gemmaria*). This might suggest that the cause of the difference is physiological, due perhaps to starving at some stage, and not genetic. Proof of this will not be immediately forthcoming as, unfortunately, the helper who attended to my sleeves while I was away succeeded in transposing the labels and in mixing some of the larvae. I shall be glad to hear from anyone else who has worked on this form of variation."

Mr Howard exhibited *Triphaena pronuba*, L., taken at sugar at Tilbury in July.

Col. P. A. Cardew exhibited (1) an undersized form of *Leucania turca*, L., taken on Wimbledon Common, July 1938, with normal specimen from S. Hants for comparison; (2) a minor aberration of *Carterocephalus* (*Cyclopides*) *palaemon*, Pall., from Peterborough District, with normal specimen. Taken May 1938.

Dr E. A. Cockayne showed a series of dark grey males of *Trichiura crataegi*, L., f. *ariae*, Hb., taken at light between 21st July and 1st August in the Rannoch district on a wind-swept moor at an elevation of 1350 feet, and read the following note:—"The date is a very early one, but in 1937 Mr R. C. R. Crewdson took both sexes on the same moor between 20th July and 7th August. He says that he has taken one occasionally in September. September is the normal time in England and I have never bred one earlier. Barrett says 'a statement is made that in the north-east of Scotland it does not feed up within the year, but hibernates as a larva, producing the moth in the following season, but this appears so improbable that one is led to suspect a confusion with one of the larger Bombyces.' Tutt makes the same statement, giving Reid as his authority. It appears to mean that the larva hibernates in a late instar. Tutt says 'Milliere notes the eggs as hatching in autumn at Cannes and this seems to be the general habit of the moorland var. *ariae*.' He also says 'there is an extreme form, which has developed into a very distinct race in moorland districts and at high altitudes and latitudes. This race appears to have an almost parallel life-history with that of *Lasiocampa quercus*, L., var. *callunae*, Palm., although perhaps there is a larger percentage of autumnal emergences in this than in the latter, and was named *ariae* by Hübner.' He then says the large mountain form has a habit of spending its first winter as an egg or young larva and its second as a pupa. He adds that Schneider says that in the far north the larva hibernates quite small, is full-fed in July or August, and that the pupa then hibernates, the imago appearing the following June. He quotes Hoffmann as saying that in the moorland districts of Upper Hartz the greater part of the imagines appear in August and September, the re-

mainder of the pupae yield the moths in the early spring of next year, and says that Horne confirms this as to the moors near Aberdeen. South records that eggs laid by a female, taken at Falkirk, hatched on 26th April, pupated early in June, and a darkish grey female emerged on 31st July. In 1906 I took part of a brood of larvae at Tongue, in Sutherland, between 1st and 3rd July, most of which spun cocoons by 11th July. The imagines, eleven in number, emerged the same year between 25th August and 2nd September, and the males all had a very dark median band on a light ground colour. Mr L. W. Newman, who has bred Scottish *crataegi* many times, tells me that the eggs always hatch in the spring and a few moths emerge the same autumn, but the majority pass a second winter in the pupal state and the moths emerge in June. Eggs from these June moths do not hatch until the following spring. I have collected all these discrepant statements, because I think there is still some doubt about the life-history of Scottish *crataegi*. Confirmation that it ever hibernates as a larva, small or large, in this country is needed before it can be accepted."

Mr E. M. Classey exhibited ova of *Nonagria sparganii*, Esp.

Mr D. H. Sterling exhibited larvae of *Notodonta dromedarius*, L., found on birch near Bromley, Kent; of *Comibaena (Euchloris) pustulata*, Hufn., from oaks near Bromley; *Cerura bifida*, Hb., from Bookham Common; and of *Cucullia asteris*, Schiff., from Dovercourt, Essex.

Mr R. J. Burton exhibited some of the progeny of a ♀ *Colias croceus*, Frery., taken by his brother at Whitsuntide in Kent. The brood resulted in 26 ♂ *croceus*, 11 ♀ *croceus*, and 12 ♀ *helice*, Hb.

Mr C. N. Hawkins subsequently added the following note on Mr Burton's exhibit:—"Apparently the female parent in this case was a typical *Colias croceus*, therefore one must assume that the unknown male parent was heterozygous for the *helice* colour factor. This factor is a sex-controlled (sex-limited) dominant and, as is usual among insects (there are exceptions), it manifests itself in the female sex only, so that females heterozygous for the factor are *helice*, while males similarly heterozygous are apparently normal *croceus*. In a pairing between a typical *croceus* and one heterozygous for the *helice* factor the expectation is that half the offspring would be typical *croceus* and half heterozygous for the *helice* colour, but the latter colour would show itself in the females only, so that all the males would appear as *croceus* while half the females would be *croceus* and half *helice*. Mr Burton's brood therefore conforms almost exactly with expectations."

Mr J. A. Stephens exhibited *Mutilla europaea*, L., ♀ (*Mutillidae*) wingless, taken at Hedge End, near Southampton, in July, crossing the garden gravel-path, and the following Coleoptera—*Tephria nivalis*, Panz., Chatham, April 1938; a *Leiopus nebulosus*, L., from pupae found under a hornbeam shrub in Chatham Park, August 1938.

Mr C. N. Hawkins, on behalf of Dr Blair, exhibited a map of the Catchment Basin of the South-East of England, published by the Society

many years ago, when a scheme was initiated by the Society to investigate and register the fauna of the area, and he asked whether anyone could inform him if any progress was made in the matter and were any results published. It appeared that very little was done to carry out this proposal owing mainly to the expense of publication, but it was believed some note-books still existed containing the information collected. It was suggested that comparison of those old lists with ones of the present day might prove very interesting and give valuable information.

Mr S. Wakely exhibited the "baker's brat," *Thermobia furnorum*, from Finsbury.

Mr Hy. J. Turner exhibited series or examples of the following species in illustration of his Notes—*Chloridea (Heliothis) dipsacea*, L., and sub-sp. *septentrionalis*, Hfmyr., *C. (H.) maritima*, Gras., and *C. (H.) ononis*, Schiff., etc., from various localities.

Mr Turner then read a paper, "Recent Discoveries in the Biological Relations of *Chloridea (Heliothis) dipsacea*, L., and *H. maritima*, Gras. (See Trans.)

22nd SEPTEMBER 1938.

The PRESIDENT in the Chair.

Mr Priske exhibited a spider (*Epeira* sp.?) with deformed front legs; also a species of tobacco plant from his garden.

Dr Cockayne exhibited an *Apamea gemina*, Hb., with pollinia of the marsh orchid, *Orchis latifolia*, L., on its proboscis, from Rannoch, 15.vii.1938, and said that several *Dianthoecia (Harmodia) cucubali*, Fuess. (*rivularis*, Fb.), with pollinia of this orchid, were taken earlier in the season by Mr Crewdson.

Mr Dale, a visitor, exhibited a specimen of *Hippotion celerio*, L., unset and in almost bred condition, captured at West Wickham, a day or two previous to the meeting, by one of the boys at his school.

Mr H. W. Andrews exhibited a ♀ specimen of the Dipteron, *Catabomba pyrastris*, L., of the form *unicolor*, Curtis, from the Thames Marshes near Dartford, Kent, taken August 1938.

Mr A. Bliss exhibited an empty pupa-case and a larva of *Apatura iris*, L., from West Sussex.

Mr Sterling exhibited larvae of *Hydriomena coeruleata*, Fb. (*impluviata*, Hb.) found during the Field Meeting in Tilgate Forest.

Mr H. Moore exhibited a stem of red currant affected by a species of scale insect; also the "angels' trumpet," a species of *Datura*.

Dr G. V. Bull exhibited a melanic *Boarmia rhomboidaria*, Schiff. (*gemmaria*, Brahm.) bred from the only larvae of the species beaten at Shoreham, Kent; and a centipede with its prey, *Calymnia trapezina*, L., taken at Ham Street on sugar.

Mr S. Wakely exhibited a variable series of *Nonagria typhae*, Thunb., bred from stems of *Typha latifolia*, L., and a series of *Crambus*

paludellus, Hb., bred at the same time from the same stems—from Sussex. “Blistered” leaves of *Scabiosa columbaria*, L., caused by the larvae of *Lithocolletis scabiosella*, Doug., with specimens of the moth bred from the same. Larvae of *Thiotricha subocella*, Steph., a case-feeding Gelechiid which feeds on the seeds of Marjoram. Larvae of the Noctuid, *Ilecatra serena*, Fb., found feeding on the flowers and seeds of *Sonchus arvensis*, L. All from Coulsdon, Surrey.

Mrs Boardman then gave her lecture, “Westward to the Golden Gate,” and showed a series of excellent slides in illustration.

13th OCTOBER 1938.

The PRESIDENT in the Chair.

The following new members were elected:—Miss Hilda Schabbel, of Holmbury St Mary; Mr D. A. Dodd, “Hammer House,” Holmwood Road, Cheam; Mr J. R. Willis, “Vine Cottage,” West Horsley; and Mr J. A. Humphreys, White Cross Service Station, Sutton Bye Pass.

Mr Priske exhibited examples of the galls, *Rhodites nervosus*, Cur., from aspen, and of *Dryophanta folii*, May., from oak.

Mr Hugh Main exhibited pupae and an empty pupa-case of *Pieris brassicae*, L., to show the long-spined summer form.

Mr August exhibited larvae of *Angerona prunaria*, L., from N.W. Sussex.

Mr S. W. C. Williams exhibited *Acronicta rumicis*, L., Broxbourne, 16.ix.38.

Dr G. V. Bull exhibited two *Triphaena fimbria*, L., showing almost identical lesions of the right hind-wings; *Xylophasia lithoxyla*, Fb., taken 12.ix.38; *Colotois (Himera) pennaria*, L., taken 21.ix.38; and a *Microgaster* sp. (probably *M. globula*) parasite on *Vanessa atalanta*, L.

Mr Hy. J. Turner exhibited several species of the genus *Heliconius*, Latr., of which he said over three hundred species and forms had been described. The genus was practically confined to Tropical America, and the species were locally very abundant, but on account of the variation it was most difficult to feel satisfied with an identification. The ground colour of all the species is black with comparatively large featured marking in red, yellow, white and blue, with green in a few forms. Many, besides being very beautiful, are interesting because of their resemblance to other species with which they fly, particularly to various species of the highly-protected family *Danaidae*. The specimens exhibited were sent from Ecuador and collected on the Western slopes of the Andes at Balzapamba, a noted locality, and at Playas. *Heliconius sappho*, Hb., *H. sara*, Gdt., f. *sprucei*, Bates, *H. atthis*, D. & Hew. were exhibited.

Mr Turner also exhibited three species of *Papilio*—*P. paeon*, Bdv., *P. erlaces*, Gray, and *P. timius*, Riff., and three species of the *Pieris*

genus, *Dismorphia*, Hb.—*D. nemesis*, Latr., *D. amphione*, Cr., and *D. thermesia*, Gdt., members of an aberrant section of this genus.

Dr K. G. Blair exhibited the Coleoptera, *Aëpopsis robinii*, Laboulb., and *Micralymma marinum*, Strm., the Hemipteron *Aëpophilus bonnairei*, Sign., and the Pseudoscorpion, *Obisium maritimum*, Leach, all from near Start Point, S. Devon. All were obtained from near low water mark by splitting the slatey rocks and boulders with a fern-trowel. The beetles and the Pseudoscorpion were in some numbers, but of the bug, in spite of some hours' diligent work, only a single adult, surrounded by a number of small nymphs, was found. Mites also, of several species, were found in the same situation but were not collected. The air-breathing fauna of these rock crevices, which must be covered by the tide for between twelve and twenty hours out of the twenty-four, is therefore considerable, and the matter of their respiration presents certain problems. When such a crevice is exposed shortly after the tide has left it, it will be found to be very wet, and the narrower ones coated with a deposit of very fine red mud. The water quickly drains away and as the mud dries the surface will frequently be found to be pitted all over. No definite cause could be found for these pits, but it seemed possible that they might have been formed by air bubbles under the pressure of perhaps 20 feet of sea water. In such crevices most of the above-mentioned creatures were found. When the crevices were wider a considerable amount of sand had been washed in, and in these marine worms, small molluscs and crustacea of several species were abundant. Some of the latter formed silken (?) tubes, which may perhaps have helped to retain a quantity of air, for *Micralymma* and a few *Aëpopsis* were found, and a Collembola and one species of mite were abundant; also, in the tubes, a number of Dipterous puparia (*Cyalarhapha*). *Aëpus marinus*, Strm., said to be commoner than the *Aëpopsis*, was not found at all, but whether because it does not occur in this locality, or because it has somewhat different habits, is uncertain.

Mr Hugh Main then read a Report of the International Congress of Entomology held at Berlin in August, at which he was present.

Reports of the Field Meetings held during the period July to October were read by the leaders and others.

27th OCTOBER 1938.

ANNUAL EXHIBITION AND CONVERSAZIONE.

Mr J. L. Atkinson exhibited a method of mounting "type" collections of butterflies for use in Schools, etc. He subsequently contributed the following note:—"The four wings of the specimen to be mounted are cut off close to the thorax with a sharp knife or razor blade and placed on a piece of glass about $3\frac{1}{2}$ inches by $5\frac{1}{2}$ inches (photographic plates are excellent for the purpose). Another piece of glass of the same

size is placed carefully over the wings and the two pieces, with the wings in between, bound together with passe partout. The best method is to cut four lengths of passe partout and bind the four edges of one piece of glass to a depth of not quite half of the width of the passe partout so as to allow for the thickness of the two sheets of glass and obtain an even binding on both sides when the second piece of glass is in position. With a little practice and a lot of patience the wings can, after being placed in the desired position, be covered with the second piece of glass and the two glasses stuck together by means of the passe partout already in position on the first plate of glass. It is as well to mount two butterflies together to show both ♂ and ♀ and also to add the antennae, although naturally this makes the process more difficult as the least breath of air will displace the wings; the extra care required is, however, well worth while. The advantage of this method of mounting is that each 'type' can be passed round separately and both upper and undersides are readily available for inspection."

Mr Attwood exhibited his chief captures of the season including:—*Acrionicta leporina*, L., *Plautena retusa*, L., *Chariclea umbra*, Huf., *Aporophyla lutulenta*, Bork., *Ochria aurago*, Fb., *Cirrhoedia xerampelina*, Hb., *Mellinia gilvago*, Esp., *M. ocellaris*, Bork., *Mamestra contigua*, Vill., *Plusia moneta*, Fb., *Nygmia (Euproctis) phaeorrhoea*, Haw. (*chrysorrhoea*, L.), *Leucoma salicis*, L., *Cosymbia (Ephyra) punctaria*, L., *Euchloris smaragdaria*, Fb.

Mr V. E. August exhibited *Pararge aegeria*, L., including a melanic form; *Brenthis euphrosyne*, L. and *Melitaea aurinia*, Rott., including several with aberrational marking; bleached forms of *Maniola jurtina*, L.; and a breeding cage with living larvae of *Sphinx ligustri*, L.

Capt. E. S. A. Baynes exhibited *Synanthedon (Sesia) flaviventris*, Stdgr., W. Surrey, 1938; *Lithosia caniola*, Hb., the Lizard Lighthouse, 1938; *Chloridea (Heliothis) peltigera*, Schiff., from Kent larvae, 1938; and a bred series of *Pachnobia (Rhyacia) hyperborea*, Zett., from pupae taken at Rannoch in 1912.

Mr P. M. Bright exhibited long series of extremely fine aberrations of *Argynnis paphia*, L., of *Hipparchia (Aphantopus) hyperantus*, L., and two nice forms of *Polyommatus (Lysandra) coridon*, Poda.

Miss Winifred M. A. Brooke exhibited sketches of various species of *Erica* and of Orchids painted by herself during a stay of some months in the Cape Province of S. Africa.

Mr F. D. Buck exhibited some of the Coleoptera he had taken in 1938, including:—

From Sandown, Isle of Wight, 25.v.38—*Calathus melanocephalus*, L., *Metabletus obscuro-guttatus*, Df., *Megemyleurus rugosus*, Ol., *Psilothrix cyaneus*, Ol., *Opatrum sabulosum*, L., *Isomira murina*, L., *Oedemera nobilis*, Sp., *Otiorrhynchus ligneus*, Ol., *Cneorrhinus plagiatus*, Sl.

From Swinley Park, Ascot, 12.vi.38—*Xylodrepa 4-pustulata*, L., *Phyllopertha horticola*, L., *Rhagium bifasciatum*, F., *Attelabus nitens*, Sp.

From Horsley, 14.v.38—*Mycetophagus 4-pustulata*, L., *Aphodius merdarius*, F., *A. prodromius*, Bm., *Grammoptera ruficornis*, F., *Hermacophaga mercurialis*, F., *Sibina potentillae*, Gm.

From Box Hill, 18.vi.38—*Lucanus cervus*, L., *Lacon murinus*, L., *Dascillus cervinus*, L., *Molorchus minor*, L.

Mr A. A. W. Buckstone exhibited a series of ab. *semiobsoleta*, Tutt of *P. (L.) coridon*, including two asymmetrical specimens from Sandown, Isle of Wight, September 1938; *Heodes (Rumicia) (Chrysophanus) phlaeas*, L., ab. *schmidtii*, Gerh. from Ashted, October 1938; a gynandromorph (R. side ♂, L. side ♀) of *Agrotis puta*, Hb., Ewell, Surrey, 19.v.38; and the Orthopteron, *Phasgonura viridissima*, L.

Dr G. V. Bull exhibited a series of a North Kent form of *Malacosoma castrensis*, L., in which the usual markings of the forewings are absent; series of varied forms of *Agrotis corticea*, Hb., *A. exclamationis*, L. and *Mamestra albicollis*, Hb., taken by himself at Camber, Sussex; two female *Lasiocampa (Bombyx) quercus*, L., from Cornwall with dark markings; and a *Gonodontis bidentata*, Clrck., deficiently scaled, bred from a larva taken at Aviemore.

Mr L. Bushby exhibited the living adult and immature specimens of the leaf-insect, *Phyllium crurifolia*, Serv., and the Land Hermit Crab, *Cenobita diogenes*, Edw.

Colonel P. A. Cardew exhibited a series of *Acosmetia caliginosa*, Hb., bred from S. Hants ova particularly to show the variation of the species.

Mr S. A. Chartres exhibited a complete gynandromorph of *Polyommatus (Lysandra) bellargus*, Rott., together with a large number of aberrations of *Rhopalocera* from Royston, South Downs, and *P. bellargus*, intersex, R. ♀ $\frac{3}{4}$ f.w. splashed with blue ♂ colour; h.w. completely blue except for two brown streaks. L. ♀ of male colouring with red marginal lunules. This specimen was taken in cōp. with an ordinary ♂ form.

Mr G. A. Cole exhibited selected Lepidoptera bred and captured during 1938. These included single specimens of *Catocala fraxini*, L. and *Leucania unipuncta*, Haw., series of *Leucania vitellina*, Hb., *Leucania albipuncta*, Fb. and *Heliophobus odis*, Hb. (*hispidus*, Hb.), all from Dorset; bred series of *Parasemia plantaginis*, L., from Wiltshire; *Polyploca ridens*, Fb. and *Plusia chryson*, Esp., from Hampshire; a series of *Atolmis rubricollis*, L., taken at rest on grasses in Hampshire; a specimen of *Acronicta leporina*, L., from London, N.W.3.; a deep brown *Demas coryli*, L., from Bucks; a *Limenitis camilla*, L. (*sibilla*, L.), var. *semi-nigrina*, Tutt, from Hampshire; some *Colias croceus*, Frery., from Kent, including a male specimen with the forewings pale and thinly scaled, the hindwings almost normal.

Dr E. A. Cockayne exhibited *Boarmia repandata*, L., 2 pairs, melanic form from Rannoch. *Bupalus piniaria*, L., 3 ♂, 1 ♀, with no white speckling on underside, white streak on hindwing. *Leucania impura*, Hb., ab. *punctilinea*, Tutt, ♀, Rannoch, 1938. *Lophopteryx camelina*, L. ab., ♀, bred E. Aberdeenshire, 1938, ground pale creamy buff;



EUXOA SEGETUM, MALE.

Ground colour pale grey-brown; submarginal line paler with darker shading proximal to it; marginal area darker than ground, but with nervures pale. Antemedian bordered distally by a black line from costa to inner margin, and postmedian bordered by a similar black line from the reniform to the inner margin. Orbicular and reniform with dark centres; and with the space between them partly filled with dark scales. The interneural spaces from the antemedian to the orbicular and from the reniform to the postmedian filled with black, the space between 2 and 3 is also filled with black. Claviform same colour as ground, the proximal and anterior part of the space between 1 and 2 is filled with black and the rest of the space is speckled with black scales.

The aberration is similar to that of *E. exclamationis* ("Newman. Brit. Moths, fig. 1'') allowing for the difference in sex.

[Drafted by Dr E. A. Cockayne.]

DR H. B. WILLIAMS.



Photo. Dr G. V. Bull.

AGROTIS EXCLAMATIONIS VARS.

The two specimens figured above were taken at sugar at
Camber near Rye in June 1938.—Dr G. V. Bull, B.A.



AGROTIS SEGETUM VAR.

median area and part of basal a pale blue-grey. *Crymodes exulis*, Lef., f. *assimilis*, Dbldy., Rannoch, 1938, 1 ♂, 2 ♀♀, one ♀ deep blackish brown with pink outer edge to orbicular.

Mr Beowulf A. Cooper exhibited two forms of *Heimerophila abruptaria*, Thnbg., occurring in both light and melanic forms of the species. All were descendants of two melanic females found mated with light males, London, May 1937.

Mr B. H. Crabtree exhibited long series of *Coenonympha tullia*, Müll. (*tiphon* Rott.) and both upper and undersides of the form *philoxenus*, Esp., from Whirall Moss, Salop and Delamere.

Mr C. B. Craske and Mr R. M. Craske exhibited a considerable number of aberrations of Lepidoptera taken during the season including *P. coridon*, Poda, slate-coloured and leaden forms and some extreme ab. *fowleri*, Sth., and a fine example of the extremely dark margined ab. *melaina*, Tutt, where the dark margin extends over much of the wing (not ab. *suffusa*, Tutt, which is a mere uniform darkening); *P. bellargus*, Rott., an extreme ab. *striata*, Tutt, underside; *P. icarus*, Rott., an extreme form of ♀ with marginal lunules greatly increased in size on all four wings; *Aricia agestis*, Hb. (*medon*, Esp.), a ♂ underside, ab. *subtus-radiata*, Obthr., and a series of 8 forms showing the various forms of symmetrical and asymmetrical white and buff markings; *Satyrus* (*Melanargia*) *galathea*, L., a ♀ with the black band on the hindwing absent; *Brenthis euphrosyne*, L., a ♂ with spot on the hindwings extended to the marginal chevrons forming wedge-shaped streaks; and other interesting forms.

Mr R. C. R. Crewdson exhibited 3 specimens of *Crymodes exulis*, Lef., f. *assimilis*, Dbldy., taken at Rannoch, viii.38; *Hadena furva*, Schiff.; *Spilosoma lubricipeda*, L. (*menthastri*, Esp.) with ground of forewings darkish cream, Rannoch; another Ballachulish, Argyile; *Boarmia repandata*, L., black with grey thorax, Rannoch; another ab. *conversaria*, Hb., with ground whitish, from Kinlochewe, Ross; and *Cucullia absinthii*, L., from larvae in South Dorset.

Mr H. L. Dolton exhibited bred series of *Colias croceus*, Frery. (*edusa*, Fb.) and communicated the following notes on the rapid breeding of this species:—On 26th August, while on holiday at Portland Bill, I took a ♀ of *Colias croceus* (*edusa*), var. *pallida*, Tutt. On arriving home on the 28th, I enclosed her on a pot of clover, upon which she commenced to lay ova as follows: August 28th, 34 ova; August 29th, 45 ova; August 30th, 48 ova; August 31st, 12 ova; September 1st, 9 ova—148 ova.

The first larvae was noticed on 6th September, when the temperature of the shed in which they were reared was 62°.

When they were four days old they seemed to feed very slowly so I increased the temperature to between 82° and 87°, dropping to 65° during the night. This had a great effect on the larvae, so much so that they fed night and day with the result that the first larvae pupated on 20th September, exactly 14 days after emergence from the ova.

The last two batches of ova did not hatch owing to not being fertile, coinciding with what I have always thought, that with butterflies copulation takes place three or four times. The first imago emerged on 28th September and the last on 8th October.

In all 101 imagines were bred: results as follows:—♂♂, 54; ♀♀, type 25; ♀♀, var. *pallida*, 22. The whole time taken from the first ova laid until the first imago appearing was exactly 31 days.

Note.—This result is about in accord with expectation; ab. *pallida*, Tutt, like ab. *helice*, Hb., is a sex-limited dominant, and the ♀ captured on 20th August was evidently a heterozygote which had paired with a homozygous typical ♂ *croceus*. The offspring would be half homozygous typical *croceus* and half heterozygous *pallida*, but the latter form shows in the ♀ only, so that all the ♂♂ appear to be *croceus*, though half of them actually carry the *pallida* factor.—C. N. HAWKINS.

Mr S. P. Doudney exhibited a number of Lepidoptera from Scotland and elsewhere including:—

From Aviemore—*Parasemia plantaginis*, L., f. *hospita*, Schiff., *Palimpsestis* or, Fb., *Perizoma blandiata*, Schiff., *P. albulata*, Schiff., *Thera cognata*, Thnbg. (*simulata*, Hb.), *Boarmia repandata*, L.

From Rannoch—*Aricia* (*Lycaena*) *agestis*, Schiff. (*astrarche*, Brgrstr.), f. *artaxerxes*, Fb., *Erebia epiphron*, Knoch., *Plusia bractea*, Fb., *P. interrogationis*, L., *Acronicta menyanthidis*, View., including a black ab. *Gnophos myrtillata*, Thnbg., *Crocallis elinguaris*, L. an ab. without the band; *Eutephria flavicinctata*, Hb., *Isturgia* (*Fidonia*) *carbonaria*, Clrck.

Mr Bernard Embry exhibited some specimens taken in 1938, including *Hama furva*, Hb. from Dover and a *Rhodometra sacraria*, L., from Hailsham, Sussex.

Mr L. H. Ennis exhibited a series of aberrations of *Callimorpha dominula*, L., taken in Hampshire with typical specimens for comparison.

Mr L. T. Ford exhibited the following Micro-lepidoptera:—*Epischia farrella*, Curt. (*boisduvaliella*, Gn.), bred June, 1938 from larvae feeding in pods of Sea Pea, Suffolk; *Homoeosoma cretaceella*, Rosslr., bred June, 1938, from larvae feeding on flowers of Ragwort, Cromer; *Salebria palumbella*, Fb., bred June, 1938, from larvae feeding on *Erica*, Dartford Heath, Kent; *Salebria obductella*, Z., bred August, 1938, from larvae feeding on Marjoram, near Canterbury. Also a case containing blown larvae of 33 species of the rarer species of Micros, and a blown full grown larva of *Manduca atropos*, L.

Mr S. W. Gadge exhibited the ova of a Dipteron laid on the outer covering of the nest of *Vespa germanica*, F.; a small nest of a wasp sp. taken from the roof inside a beehive; a dark suffused form of *Cidaria* (*Xanthorhoe*) *fluctuata*, L., and a light form of *Epinephele* (*Maniola*) *jurtina*, L.

Mr F. T. Grant exhibited a series of the Coleopteron, *Agabus brunnaeus*, F., from the New Forest, and also two West Indian

Dinastids, found in Gravesend. [*Strategus titanus*, F., a species not uncommonly introduced into this country with bananas from Jamaica. —K. G. B.].

Dr H. G. Harris exhibited a large number of his captures of Rhopalocera at Weesen and Pontresina in August, 1938, with Dr E. Scott and Mrs Scott. [See *Ent. Record*, LI., 20, 1939].

Dr J. Hope exhibited a series of ab. *citronia*, Frowh. of *Pieris napi*, L. bred in 1938.

Mr C. N. Hawkins exhibited:—

Short series of *Collix sparsata*, Fr., bred from Byfleet larvae, showing tendency to melanism; *Lycia hirtaria*, Clrek. (males) from Wimbledon and Wandsworth Common, the former having the cross lines very thin and distinct on a pale grey ground and the latter including a remarkable pale ochreous specimen with no black scales, 1938.

A ♀ specimen of *Hyloicus pinastri*, Linn., bred this year from Dorset ova received from Dr Bull. It remained two years in the pupa.

A melanochoic female of *Stauropus fagi*, L., bred this year from a larva beaten from Oak at Byfleet in 1937.

Two specimens of *Diphthera (Moma) alpium*, Osb. (*orion*, Esp.), bred from Kent larvae, 1938.

An orange ground-colour form of *Metachrostis perla*, Fab., from Ashted, 1938.

A specimen of *Ematurga atomaria*, Led., with one cross-line absent on fore and hind-wings, bred from Sussex ova, 1938.

A specimen of *Aegeria (Trochilium) apiformis*, Cl., Effingham, bred 1938.

A short series of *Sphecia (Trochilium) crabroniformis*, Lewin, Broomfield, bred 1938.

A blackish specimen of *Apamea ophiogramma*, Esp., taken at Wimbledon, 1938.

Mr J. O. T. Howard exhibited single specimens of the following varieties:—*Cosmotriche potatoria*, L., a pale yellow ♂ from Wicken; *Endrosa irrorella*, Clrek., a ♀ var. *signata*, Borkh.; *Chiasma clathrata*, L., ab. *nocturnata*, Fuchs.; *Lycia hirtaria*, Clrek., a ghost-like ♂ ab. from Hampstead.

Bred series of *Plusia chryson*, Esp. larvae from the Test Valley, light and dark forms of *Heemerophila abruptaria*, Thnbg., from ova laid by a dark Hampstead ♀ (2nd gen. emerged Aug.-Sept.).

Captured series of *Lithosia griseola*, Hb., and its f. *stramineola*, Dbldy. from Barton Broad; *Pelosia muscerda*, Hufn., Barton Broad; *Tapinostola bondii*, Knaggs., from Folkestone; *Leucania brevilinea*, Fenn., from Barton Broad; *Monima (Taeniocampa) gracilis*, Fb., the pink form from Perthshire, and a white specimen from Struan, *Sterrhia (Acidalia) ochrata*, Scop., from Sandwich, and *Lithostege griseata*, Schiff., from Brandon.

Mr Leonard G. Hulls exhibited studies in the life-history of *Manduca (Acherontia) atropos* L.:—

(1) Moth which had emerged on 13th September.

(2) Pupa (pupation occurred on 25th October).

(3) Living young larva taken on 12th October.

(4) A series of paintings by Mrs E. H. C. Hulls, showing the four distinct types of *atropos* larvae found in West Sussex during 1938, and illustrating the remarkable colour changes which occur during the period of change from larva to pupa.

(5) A graph showing the loss in weight which occurs during pupation, the period in which the larva is able to produce the clicking noise, and the increase of the loss in weight due to the voidance of alkaline fluid, etc., was shown.

Mr F. W. J. Jackson exhibited aberrations of *Polyommatus (Lysandra) coridon*, Poda, and a pale ♂ *Colias croceus*, Frery., from Bembridge, 1938.

Mr Russell James, sen., and Mr Russell James, jun., exhibited the season's captures, which included series of *Leucania l-album*, L., *L. albipuncta*, Fb., *L. vitellina*, Hb., *Cirrhoedia (Atethmia) xerampelina*, Hb., *Asteroscopus nubeculosa*, Esp. (bred); *Agrotis (Peridroma) saucia*, Hb., *Calocampa solidaginis*, Hb., *Cucullia lychnitis* Rmbr. (bred), *Ptilophora plumigera*, Esp., *Lophopteryx carmelita*, Esp., *L. cuculla*, Esp., and *Nyssia zonaria*, Schiff., also a case containing the "clearwings" *Synanthedon (Aegeria, Sesia) vespiformis*, Lasp., *S. (A., S.) andrenaeformis*, Lasp., *S. (A., S.) formicaeformis*, Esp., and *S. (A., S.) flaviventris*, Stdgr.

Col. S. H. Kershaw exhibited varieties taken this season in Bucks, Beds, Northants, the New Forest, including the *semisyngrapha* and striated forms of *P. (L.) coridon*, *Heodes (Chrysophanus) phlaeas*, L., *A. hyperantus*, L., *Euchloë cardamines*, L., *Pararge megera*, L., *Pieris rapae*, L., and *P. napi*, L.

Mr H. A. Leeds exhibited 45 specimens, being aberrations of 11 species of British Rhopalocera captured during 1938, each described by the use of the descriptive terms used in Bright and Leeds' recently published work on *L. coridon*. They included:—*Polyommatus (Lysandra) coridon*, Poda, ♂ uppersides (marginata) (ultrapunctata); ♀ underside, ultraconfluentiae (sinis - I - nigrum - semiarcuata - dex-I-nigrum - arcuata - parallela); and an Intersex, *roystonensis*, with all wings mainly blue scaled. *P. (L.) bellargus*, Rott., ♂ underside (ultrafowleri). *P. icarus*, Rott., ♀ uppersides (opposita) (antibiirregularia with left wing blue and right wing greenish), (radiosa); ♂ and ♀ undersides (antidisco-elongata), (radiata). *Euchloë cardamines*, L., ♂ upperside (lunaextensa). *Heodes (Lycæna) phlaeas*, L., ♀ upperside, left forewing containing a broad streak, via the discoidal, from base to outer border blacking the latter, perhaps the equivalent of (antisinis-inaequalis) in *coridon*? *Coenonympha pamphilus*, L., ♂ upperside, ab. (lacticolor). Several (partimtransformis) of various species. Also an extreme melanic form of *Maniola jurtina*, L., ♂ underside containing no fulvous colour.

Rev. J. N. Marcon exhibited a selection from his year's captures, including:—*Polyommatus (Lysandra) bellargus*, Rott. (*adonis*, Fb.), ♀ radiate forewings, h.w. with a few dashes on a whitish ground, ♀ radiate forewings strongly developed and one ray on each h.w., ♀ radiate hindwings, asymmetrical, a spring brood ♀ all wings with thin radiations. *Argynnis aglaia*, L., ♂ forewings black except 2 spots remaining fulvous (one a dot); h.w. normal but heavily dusted with black scaling, underside f.w. heavily banded and m.w. with extraordinary blue-green ground even affecting the usual silvery markings. *Brenthis euphrosyne*, L., ♂ forewing two-thirds black, the remainder (outer) rich fulvous, lightly marked in strong contrast, h.w. mainly black, underside f.w. extensive black area, h.w. nearly normal. *Eumenis semele*, L., f.w. with 5 spots instead of 2 (rare). An olivaceous ♂ form of *P. (L.) coridon*, a radiate ♂ all 4 wings, ♂ *caeca*, in form with white underside, ♂ underside with extreme plumbeous suffusion; and a ♀ radiate and striate combined, h.w. with a few faint radiations on a cream ground.

Mr D. G. Marsh exhibited a remarkable (possibly unique) aberration of *Lymantria monacha*, L.; a very small male with the black markings on the forewings concentrated into a thick longitudinal streak at the base, a transverse spot or two in the median area and a wavy subterminal line. He also showed an abnormal specimen of *Hadena (?) genistae*, Bkh., with the post-median fascia crossing the middle of the forewing, thus leaving the whole distal portion of the wing light coloured.

Mr A. M. Morley exhibited the following Lepidoptera:—*Hyloicus (Sphinx) pinastri*, L., at light in the New Forest; *Abraxas grossulariata*, L., selected from 62 examples bred from wild larvae collected in Folkestone, including 2 f. *dohrnii*, Knig. (*lacticolor*, Rayn.) and 1 with smoky forewings; *Rhyacia cinerea*, Hb., Romney Marsh, pale ♂, dark ♂, dark ♀; *Heliothis (Chloridea) peltigera*, Schiff., a pale example from Romney Marsh, and darker specimens bred in September; *Euxoa segetum*, Schiff., a very unusual form with a dark central band; *Leucania unipuncta*, Haw., Romney Marsh, 30.ix.38; *Polyommatus (Lycaena) coridon*, Poda, ♂ ab. *fowleri*, South, Dorset, ♂ underside with large discoidals, Sussex, ♂ *albolunulata*, Tutt, ♂ *biarcuata*, Tutt, ♀ *obsoleta*, Tutt, ♂ underside, Folkestone (antico-obsoleta); *Polyommatus (Lycaena) icarus*, Rott., underside with elongate spots.

Mr G. B. Oliver exhibited:—

Colias croceus, Frery. A variable series of ab. *pallida*, Tutt, and f. *helice*, Hb., with typical shades of the female and male, both showing the outer margin inwardly rayed on the forewing. All reared during August from ova obtained from a specimen of *pallida* taken at Sandown in June. Also the inbred October brood recently emerged, displayed on setting boards, showing further considerable variation in both ab. *helice* and typical: rich sulphur-yellow forms, etc.; a female with 3 wings typical and right forewing with a large patch of *helice* coloration; rayed specimens as in the August brood and other striking forms.

Argynnis cydippe, L. (*adippe*, L.). Underside variations: lightly silver spotted; heavily silver spotted with basal spots joined. A bred pair of the scarce "Auburn" tinted form with silver spots slightly bronzed.

A. euphrosyne, L. Wild taken males, showing undersides closely matching in tones the *cydippe* colour vars.

Melitaea athalia, Rott. A pair of the "straw" form, inbred 1938 from a bred straw ♀ of 1936, Kent. An aberration taken in Essex, near var. *eos*, Haw., underside forewings being almost unmarked, but hindwings with the outer portion whitish edged, and a dark basal patch. Another rather similar specimen except that the right forewing underside carries the six black striations as in *eos*, the left forewing being unmarked. This last aberration having been taken in Bucks, a newly founded colony, started in 1936 on the Chiltern Hills.

Mr L. W. Newman exhibited a long series of *Lasiocampa quercus*, L., f. *callunae*, Palm., showing great variation including ab. *olivacea*, Tutt, from Caithness; an extremely dark form of *P. napi*, L., from Caithness; and a *Callimorpha dominula*, L., with forewings almost entirely black and hindwings well banded, from the Oxford district.

Mr L. H. Newman exhibited several *P. (L.) bellargus*, Rott., from Folkestone, including a ♂ with pure white ground on the underside.

Mr A. H. Peach exhibited *P. (L.) coridon*, radiate, striate, *fowleri*, Sth., etc., and a *Gonodontis bidentata*, Clrck., with black border area and with partially undeveloped scaling.

Mr W. L. Rudland exhibited Lepidoptera taken or bred in the Reading district, 1938, including:—*Odontosia carmelita*, Esp. (Stoke Row, Oxon., a pair taken in cop. in a beech wood). *Demas coryli*, L. (a very dark specimen). *Bomolocha fontis*, Thnb. (bred). *Pyralis glaucinalis*, L. (bred from an old squirrel's drey composed of dead oak leaves). *Cacoecia piceana*, L. (bred). *Tortrix costana*, F. (bred). *Peronea umbrana*, Hb. *P. cristana*, F. (including some thirty forms). *P. hastiana*, L. (bred). *Eucosma foenella*, L. (bred). *Laspeyresia coniferana*, Rtz. (bred). *Epigraphora steinkellneriana*, Schiff. *Cerostoma caudella*, L. (bred from ova). *C. lucella*, F. (bred). *C. vittella*, L. (bred). *Bedellia somnulentella*, Z. (bred). *Monopsis weaverella*, Scott.

Mr A. G. B. Russell and Mr J. A. P. Russell exhibited a selection of insects taken in the past year including series of *Crymodes (Hadena) exulis*, Lef., *Graphiphora festiva*, Hübn., var. *thulei*, Staudinger, *Perizoma albulata*, Schiff., var. *thules*, Weir, as well as examples of *Xanthorhoe montanata*, Borkh., var. *shetlandica*, Weir, *X. munitata*, Hübn., var. *hethlandica*, Prout, *Hydriomena caesiata*, Lang, var. *annosata*, Zetterstedt, *Hepialus humuli*, L. var. *thulensis*, Newman, one of the last named being an unusually dark brown ♀—all the above from the Island of Unst, Shetland; also series of *Spodoptera exigua*, Hübn., from Swanage, *Pseudopanthera pictaria*, Curt., from Surrey; *Ptychopoda rusticata*, Fabr. from Kent, *Apocheima lapponaria*, Boisd. from Perth, 4 *Aplasta ononaria*, Fuessl. from Kent, and examples of *Hydrio-*

mena taeniata, Steph. from Lancs, *Leucania favicolor*, Barr. from Kent, *Harmodia irregularis*, Hufn. from Suffolk, *Diphtera orion*, Esp. from Hants, *Hydriomena ruberata*, Freyer. from Dorset, as well as a fine pink form of *Monima* (*Taeniocampa*) *gracilis*, Fabr. from Perth, and an interesting striated aberration of *Diacrisia lubricipeda*, L. (*menthas-tri*, Esp.) from Hants.

Mr S. G. Castle Russell exhibited *Pieris napi*, L., 1758. A very heavily spotted ♀ taken in Surrey with an example of the Irish form for comparison. Two underside aberrations—one being without markings and the other heavily marked; both taken in Surrey. *Euchloë cardamines*, L., 1758. Upper and undersides. Yorks. *Maniola tithonus*, L., 1771, ab. *mincki*, Seeb. New Milton. *Maniola jurtina*, L., 1771. Golden coloured upperside ♀♀ taken by Mrs P. Nagle at Worth, Dorset. *Limenitis camilla*, L., 1764 (*sibilla*, L.), an example of ab. *nigrina*, Weym. and var. *minor*, New Forest. *Polyommatus* (L.) *icarus*, Rott., 1775, abs. *furva*, and the rare *caerumaculæ* (♀♀), *Polyommatus* (*Lysandra*) *coridon*, Poda, 1761. Series of upper and underside aberrations including the rare forms of (*discoidalis nulla*) (upperside ♀♀), *parvipuncta* ♀♀, (*alba caeca*) ♂♂, (*antidigitata*) ♀♀—all from Wilts and Sussex. *Syrictus malvae*, L., 1758. Three abnormally coloured forms. Example of homoeosis—*P.* (L.) *coridon* ♀♀. Examples of heteromorphosis—*P.* (L.) *coridon* ♂♂ and *Hipparchia* (*Aphantopus*) *hyperantus*, L., 1758.

On behalf of Mr F. V. L. Jarvis, Mr S. G. Castle Russell exhibited *P.* (L.) *coridon*, (*ultramelaina*) and (*suavis*) and, on behalf of Col. L. Wood, a *P.* (L.) *coridon*, an extreme example of ab. *inequalis*, Tutt, the left side wings being almost completely blue. Wilts, 12.vi.38, and a *P.* (L.) *bellargus*, a very extreme ♀ underside example of ab. *radiata* (*extrema*, per Bright's book): the forewings being very heavily radiated, the radiations running from the marginal spots to the thorax and of a deep black. The lower wings are of *obsoleta* type. Ground colour of both wings cream white. Wilts, 9.ix.38.

Mr B. Harold Smith exhibited a gynandromorph of *P.* (L.) *coridon*, and ♀ ab. *biarcuata*, Tutt, and ab. *obsoleta*, Tutt; *H.* (C.) *phlaeas*, L., ab. *radiata*, Tutt, and ab. *subradiata*, Tutt.

Mr B. B. Snell exhibited several British Lepidoptera including *Tortrix postvittana*, Meyrick, the Australian species recently announced as having been found in the Lancashire area, *Hyloicus pinastri*, L., *Synanthedon scoliaeformis*, Bork., *Dimorpha versicolora*, L., *Aplecta nebulosa*, Hufn., ab. *robsoni*, *Boarmia repandata*, L., ab. *conversaria*, Hb., *Biston betularia*, L., ab. *carbonaria*, Jord. (*doubledayaria*, Mill.), *Lycia* (*Biston*) *hirtaria*, Clrek., Scotch form; *Gnophos myrtillata*, Thnbg., *Cidaria* (*Xanthorhoë*) *munitata*, Hb., *Venusia cambrica*, Curt., and dark forms of *Lygris populata*, L.

Dr G. H. T. Stovin exhibited a number of aberrational forms of *Abraxas grossulariata*, L., with two forms possibly new.

Mr Hy. J. Turner exhibited about 100 "common" butterflies taken in the Harbin area of Manchuria. That they were predominantly Palaearctic was very apparent; they were either forms of common European species or of species closely allied.

Mr S. Wakely exhibited 360 different species of Lepidoptera collected during the year 1938, among which were the following, all reared from larvae or pupae:—*Melitaea athalia*, Rott. (S.E. Essex); *Vanessa c-album*, L. (Boxhill, Surrey); *Nudaria mundana*, L. (Swanage, Dorset); *Leptomeris marginepunctata*, Goze (Sandown, I.W.); *Epischia banksiella*, Rich. (Swanage, Dorset); *Nephopteryx genistella*, Dup. (Sandown and Gurnard, I.W.); *Myelois neophanes*, Durrant (Westerham, Kent); *Crumbus paludellus*, Hübn. (near Brighton, Sussex); *Pyrausta stachydalis*, Zinck. (Freshwater, I.W.); *Pyrallis glaucinalis*, L. (Padworth, Berks.); *Pterophorus osteodactylus*, Zell. (Grange-over-Sands, Lancs.); *Adaina microdactyla*, Hübn. (Sandown, I.W.); *Agdistis statites*, Mill. (Portland, Dorset); *Phalonia gilvicomana*, Zell. (Surrey); *Evetria sylvestrana*, Curt. (Bournemouth, Hants.); *Eucosma diniana*, Guen. (Mickleham, Surrey); *E. conterminana*, Herr.-Schaff. (Kent); *Endothenia nigrocostana*, Haw. (Petts Wood, Kent); *Argyroproctus salicella*, L. (Swanage, Dorset); *A. bifasciana*, Haw. (Bournemouth, Hants.); *Laspesyesia servillana*, Dup. (Oxshott, Surrey); *L. strobilella*, L. (Clandon, Surrey); *Enarmonia conicolana*, Heylaerts (Broadwater Forest, Surrey); *Telphusa scriptella*, Hübn. (Kent); *Gelechia diffinis*, Haw. (Chilworth, Surrey); *Phthorimaea suadella*, Rich. (Chesil Beach, Dorset); *P. seminella*, Pierce & Metcalfe (Whippingham, I.W.); *P. plantaginella*, Staint. (Swanage, Dorset); *P. leucomelanella*, Zell. (Chesil Beach, Dorset); *P. acuminatella*, Sirc. (Norwood, Surrey); *Chrysoclista atra*, Haw. (Bexley, Kent); *Stephensia brunnichiella*, L. (Coulsdon, Surrey); *Elachista cinereopunctella*, L. (Coulsdon, Surrey); (Riddlesdown, Surrey); *Douglasia ocnorostomella*, Staint. (Selsdon, Surrey); *Zelleria hepariella*, Staint. (Bexhill, Surrey); *Coleophora vibicella*, Hübn. (Gurnard and Newtown, I.W.); *C. saturatella*, Staint. (Hadleigh, Essex); *C. discordella*, Zell. (Portland, Dorset); *C. genistae*, Staint. (Bookham, Surrey); *C. erigerella*, Ford (Gravesend, Kent); *Lithocolletis scabiosella*, Doug. (Coulsdon, Surrey); *Cerostoma caudella*, L. (Mapledurham, Oxon.); *Meesia richardsoni*, Wals. (Portland, Dorset); *Nemotois fasciella*, Fabr. (Kent).

Mr H. O. Wells exhibited aberrations of British Rhopalocera taken by himself in 1938, including *Polygonia c-album*, L., two very fine nearly black forms from the Wye Valley, two ♀ *P. (L.) coridon*, one ab. *obsoleta*, Tutt with white margins from Hertfordshire and the other also ab. *obsoleta* from Eastbourne.

Mr A. Welti exhibited *Cossidae* and *Sesiidae* (*Aegeriidae*) with pupa-cases.

Baron C. G. M. de Worms exhibited a selection of British Lepidoptera taken and bred at the end of 1937 and during 1938. Uncommon species and varieties of British Lepidoptera taken during 1938:—*P. (Lysandra) bellargus*, Rott. Blue forms of females and an *obsoleta*, Tutt, underside

male. (Coltswolds). *L. (Agriades) coridon*, Poda, f. *syngrapha*, Kef. and two *obsoleta*, Tutt, undersides. *P. (Lycaena) icarus*, Rott. Very blue females and a diminutive male. (Coltswolds). *Plebeius argus*, L. An entirely brown upperside female and two other females heavily marked with blue and orange respectively. (Kent). *Plebeius argus*, L. (*aegon*, Schiff.), f. *cretacea*, series taken in North Kent. *Lycaena astrarche*, L., f. *artaxerxes*, series taken at Muchalls, Aberdeenshire. *Ptilophora plumigera*, Esp. (East Kent). *Metachrostis (Bryophila) muralis*, Först., f. *impar*, Warr., dark example. (Cambridge). *Spilosoma lubricipeda*, L. (*menthastri*, Esp.). Male example almost devoid of spots. (Sussex). *Hadena matura*, Hufn., very pale form. (Kent). *Monima (Taeniacampa) munda*, Esp., male heavily banded. (Bred from New Forest female also heavily banded). *Endromis versicolora*, L. (Aviemore). *Noctua strigula*, Thnbg. (Unst, Shetland). *Agrotis saucia*, Hb., *nigrocosta* forms (Kent). *Noctua stigmatica*, Hb. (East Kent). *Eurois occulta*, L. (bred ex Rannoch). *Crymodes exulis*, Lef., thirteen examples showing degrees of variation (Unst, Shetland). *Helio-phobus oditis*, Hb. (*hispidus*, Hb.) (Dorset). *Dasypolia templi*, Thnbg., bred (Unst, Shetland). *Hydroecia petasitis*, Dbldy. (West of England). *Leucania l-album*, L. (South Devon). *Caradrina ambigua*, Fb. (East Kent). *Laphygma exigua*, Hb. (Southern Counties). *Calymnia diffinis*, L. (Wicken Fen). *Aplasta ononaria*, Fuess., four males and one female. (East Kent). *Aleucis pictaria*, Curt. = *Bapta distinctata*, Curt. (Surrey). *Ennomos fuscantaria*, Steph. (East Kent). *Apocheima hispidaria*, Schiff. (Berks). *Nothopteryx (Lobophora) carpinata*, Brk., banded forms (Aviemore). *Philereme transversata*, Hufn. (*Scotosia rhamnata*, Schiff.), bred (Hants). *Xanthorhoë munitata*, Hb., dark form (Unst, Shetland). *X. montanata*, Schiff., brown forms (Unst, Shetland). *Perizoma albulata*, Schiff., f. *thulee*, Weir. (Unst, Shetland). *Hydriomena ruberata*, Frr. (Northants and Dorset). *Eupithecia abbreviata*, Steph., melanic forms (Gloucestershire). *Hepialus humuli*, L., f. *thulensis*, Newm. (*Hethlandica*, Stdgr.), (Unst, Shetland).

Exhibits were also made, of which no particulars were forthcoming, by Dr E. Scott, Messrs C. G. Priest, Watkins, Clifford Wells, and others.

10th NOVEMBER 1938.

The PRESIDENT in the Chair.

The new members were Mr A. E. Stafford, 'Corydonis,' 8 Colbourne Way, Worcester Park; Mr John Tetley, 'White Cottage,' Horley; and Mr R. Frank Haynes, 118 Court Lane, Dulwich.

Dr E. A. Cockayne exhibited *Ellopija prosapiaria*, L., ♂, Oxshott, 19.vi.38. Forewings each with large almost symmetrical scaleless area comprising cells Ib, Ic, II, and parts of III, IV, and V. Fringes present. Hindwings both crippled but with basal area almost scaleless.

Mr J. O. T. Howard exhibited *Eumichtis (Epunda) lichenea*, Hb., a short series bred from larvae found near Dover, 9.iv.38.

Mr Hy. J. Turner exhibited a series of the small Pierid, *Nathalis jole*, Bdv., from Pasadena, California, Cuba, Arizona, Vera Cruz, Mexico, Miami, and St Petersburg, U.S.A. The ♀ form *irene*, Fitch, with deep orange-yellow hindwings was included in the series. The species also occurs in Colombia. Cuba ssp. is known as *felicia*, Poey, and is sometimes considered a distinct species.

Mr Howarth exhibited examples of *Brenthis selene*, Schiff., two of which were considerably suffused at the base of the wings; also a pupa of *Eutricha quercifolia*, L., of which the larva was found at Benfleet in May. It was slow in feeding up and when full grown wandered about the cage, and finally pupated without making a cocoon. The pupa had none of the white bloom which is as a rule so characteristic of this species.

Mr Sterling exhibited aberrations of *Mimas tiliae*, L., bred from pupae dug on Wimbledon Common: (1) A large specimen of the "one-spot" type; (2) A specimen having the spots on the forewings joined to form a bar; (3) A specimen with suffused colouring; (4) A specimen with large spots on the forewings, and ground colour darker than usual.

Exhibitions of lantern slides then took place.

Mr Hughes, a visitor, showed a series of coloured slides.

Mr Dennis, a series of photographs of uncommon plants.

Mr Syms, slides showing the ova of the Hemiptera—*Troilus luridus*, F., *Pentatoma rufipes*, L., *Palomena prasina*, L., *Piezodorus lituratus*, F., *Coranus subapterus*, De G., *Cimex lectularius*, L., and nymph and adult of *Acanthosoma haemorrhoidalis*, L.

24th NOVEMBER 1938.

The Vice-President, Mr F. J. COULSON, in the Chair.

Mr S. H. Brown, Golders Green; Mr W. E. Minnion, Banstead; Mr G. M. Conder, Sutton; Mr C. Down, Kingsbury, and Mr F. V. S. Jarvis, Sutton, were elected members.

Mr Jacobs exhibited a specimen of *Lita (Phthorimaea) inflativorella*, Klimesch, a new species described this year by Mr Klimesch, from the Pecs district of Hungary, galling the stems of *Silene inflata*, Sm. The insect pupates in the gall and the moth emerges from a prepared exit.

Mr B. A. Cooper exhibited a newly emerged *Manduca atropos*, L., which had been squeaking, but it could not be prevailed upon to do so during the meeting.

Mr J. O. T. Howard exhibited *Pachygasteria (Lasiocampa) trifolii*, Esp., an aberrant cocoon in the shape of a hammock, spun by a larva taken near Wareham, 2.vii.36, with the empty larval and pupal skins and the imago, a perfect ♀, which emerged 17.viii.36. Also 3 bandless ♂♂ which were among very large numbers of typical specimens attracted to her the same evening at Dungeness.

He also recorded an incredible plague of flies in Hampstead during the heat wave in the early part of this month (November). Hardly any

were noticed during the summer, but about 14th November it became necessary to buy fly-papers and a Flit-gun, when several hundred were slain. It is suggested that these were flies from the garden seeking shelter. They have been frequently reported.

Mr Hy. J. Turner referred to the abundance of species and forms of the *Hesperiidae*, or *Grypocera* as they are often called, to be found on the American continent, particularly in the more tropical portions; and exhibited *Pyrrhopyge telassa*, Hew., *P. scylla*, Mén., *P. araethyrea*, Hew., and *Telegonus habana*, Luc., the 3 first from the mainland, the last from Cuba. A considerable proportion of the some 2000 species listed for the Americas have a black ground with sparse marking of a strongly contrasting colour, red, orange, white, etc., but rarely blue as in the *T. habana* exhibited.

Mr H. W. Andrews exhibited numerous specimens of Hymenoptera and Diptera showing the comparative dates of emergence of the Hymenopterous parasites and their Trypetid (Dipterous) hosts. (Owing to subsequent damage in transit it has been impossible to identify the parasites).

Mr Nixon read a short paper on Hymenoptera and exhibited a few lantern slides of wing venation, etc.

8th DECEMBER 1938.

The PRESIDENT in the Chair.

Mr Hy. J. Turner exhibited several species of Exotic *Hesperiidae* and read the following notes:—

“ At the last meeting, when I exhibited some of the more striking American *Hesperiidae*, a remark was made that many British entomologists were not aware that any species of this family attained so large a size. The present exhibit contains a series of an Indo-Malay species, *Erionotus thrax*, L., measuring about 3 ins. in expanse. It is the largest Asiatic Hesperiid and is found in all parts of the region except the Australian sub-region. The series contains a form, ab. *acroleuca*, de Nice., in which the apex of the forewings is yellowish-white. This form is racial in the Andaman Islands, but elsewhere only aberrational. The proboscis is exceptionally long and the palpi thick and heavy.

“ The life-history is interesting and I quote it from Dr Seitz's work. The larva is snow-white, covered with a very short wax-like pubescence, and with a black head. It is easily discovered as it gnaws out of the gigantic banana leaves by 2 parallel cuts, a longitudinal piece which it rolls up like a cigar, in the centre of which it lives, and pupates. The pupa is of a dingy pale yellow with a very long case for the proboscis projecting beyond the end of the abdomen like a spear.' It is stated that when flying the perfect insects make a kind of scratching noise, possibly enquiring if there be any banana in their neighbourhood.

"Turning to the African Region, I have put in a pair of the largest species there, *Pyrrhocalcia (Rhopalocampta) iphis*, Dry., also about 3 inches in expanse; a unicolorous species with black thorax, abdomen and wings with a blue reflection in the male; the female differing only by the elongate interneural submarginal deep green spots. From the basin of the river Niger."

Dr H. B. Williams read the following notes on the variation in *Hadena dentina*, Esp:—

Tutt, in "British Noctuae and their Varieties," III, 80, discusses the Variation of *Hadena dentina*, Esp. At the sale of the Hanbury collection on 15th November 1938, I acquired part of Tutt's series of this species. I exhibit:—

(1) A specimen from Panton, typical *dentina*, June 1896, with Tutt's original label, "*dentina* (type)."

(2) ab. *leucostigma*, Haw., Hazeleigh, Essex, June 1897. Of this form Tutt says "this is the whitest form of the species."

(3) ab. *obsoleta*, Tutt, Hazeleigh, Essex, June 1897. The specimen shown is the single specimen bearing this name, but cannot be Tutt's type, as Vol. III of "Brit. Noct." was published in June 1892. Tutt describes this form (*loc. cit.*, p. 81) as "of the same ashy-grey ground colour as typical *dentina*, but without the darker markings round the stigmata, the whole wing being comparatively unicolorous."

(4) ab. *ochrea*, Tutt, a specimen from Panton, May 1892, and another taken by Hanbury at Wye, May 1893. The first of the specimens shown may be Tutt's type of this aberration, an ochreous-grey form (*loc. cit.*, p. 81).

(5) ab. *latenai*, Pierret. A specimen from Panton, June 1892. Tutt says "This is a melanic form of *dentina*, and in Britain, so far as I know, very rare, although I believe some numbers were brought from the Hebrides by the Messrs Salvage a few years ago."

I also exhibit for comparison:—

(6) A specimen from Co. Cork, McArthur, 1893.

(7) Two specimens from Sutherland, Salvage, 1892.

I propose to offer these specimens to the British Museum collection.

Mr August exhibited specimens of the small Vanessid butterfly, *Araschnia levana*, L., of the summer brood f. *prorsa*, L., taken in the Vosges Mts.

Mr O'Farrell then showed a series of coloured films taken during an expedition to Lapland and gave an interesting and amusing commentary on his experiences.

12th JANUARY 1939.

The PRESIDENT in the Chair.

The decease of two members had been communicated to the Society, Mr W. S. Gillies, F.R.E.S., F.I.C., and Mr P. Brodie, B.A.

Election:—Mr E. J. Summers, 33 Cumnor Road, Sutton, was elected a member.

Mr Hy. J. Turner exhibited foreign examples of the Noctuid, *Chloridea* (*Heliothis*) *scutosa*, Schiff., and stated the species was an extremely rare visitor to this country. Recently a specimen, reported to have been captured in the eastern counties in 1938, was exhibited at the Royal Entomological Society's meeting.

Mr A. A. W. Buckstone exhibited a series of dark forms of *Eumenis semele*, L., from the sandy heath at Wisley, Surrey, together with paler forms from the chalk downs at Dorking, Surrey, and Freshwater, I. of Wight, for comparison. About thirty years ago several members of this Society, including himself, failed to find the species at Wisley, but last year he found it plentiful in this locality.

Dr G. V. Bull exhibited two cocoons of *Saturnia pavonia*, L.: (1) A cocoon, which the larva, after constructing it, abandoned and pupated outside; (2) A cocoon with the exit end rounded, thus causing it to appear symmetrical.

Mr F. D. Buck exhibited a box containing his captures at Ruislip Reservoir on 1st January 1939. It is surprising the number of beetles that were about considering the fortnight previous was intensely cold. The method of collecting undertaken was that of pulling up isolated grass roots and breaking them up over a white sheet. One or two good things were found including: *Notaris scirpi*, F., *Clivina fossor*, L., *Bembidion biguttatum*, F., and *B. clarki*, Dw. *Phytonomus nigrirostre*, F., was also taken, but very badly rubbed, leaving very few of the green scales. The beetles, it seems, had not been killed off by the cold nor had they gone down into the earth. Grass roots were taken up with the soil but nothing was obtained until the soil had been disposed of and the grass had been broken up.

The following is a full list of species exhibited:—*Xantholinus linearis*, Ol., *Mycetoporus splendidus*, Gr., *Astenus immaculatus*, S., *Hygronoma dimidiata*, Gr., *Gabrieus nigrifulus*, Gr., *Stenus latifrons*, Er., *S. clavicornis*, Sp., *S. junco*, F., *Oxytelus rugosus*, F., *Phytonomus nigrirostre*, F., *Notaris scirpi*, F., *Agonum marginatum*, L., *Pterostichus vernalis*, Pz., *P. diligens*, St., *Stenolophus mixtus*, Hb., *Dromius linearis*, Ol., *D. melanocephalus*, *Bembidion biguttatum*, F., *B. clarki*, Dw., *Bradycellus harpalinus*, Se., *B. sharpi*, Jy., *Acupalpus luridus* Pj., *Chrysomela polita*, L.

Mr A. Bliss exhibited the Noctuid, *Scopelosoma satellitia*, L., taken in the New Forest on the occasion of the Field Meeting last autumn.

Reports of the Field Meetings held at Bookham and at Holmsley, New Forest, were presented, together with an account of the visit to the Rothschild Museum at Tring, by the Excursion Secretary.

Series of Lantern Slides were then shown by Messrs A. W. Dennis, E. B. Pinniger and H. J. Finnigan.

26th JANUARY 1939.

ANNUAL MEETING.

Mr F. S. STANLEY-SMITH, F.R.E.S., President, in the Chair.

The Reports of the Treasurer and Council were read and adopted and the Balance Sheet was also submitted and passed.

The following is a List of Officers and Council for the ensuing year 1939, who were declared by the President as duly elected:—

President—H. B. Williams, LL.D., F.R.E.S. *Vice-Presidents*—F. S. Stanley-Smith, F.R.E.S.; E. A. Cockayne, D.M., F.R.C.P., F.R.E.S. *Hon. Treasurer*—T. R. Eagles. *Hon. Librarian*—E. E. Symes, F.R.E.S. *Hon. Curator*—S. R. Ashby, F.R.E.S. *Hon. Editor of Proceedings*—Hy. J. Turner, F.R.E.S., F.R.H.S. *Hon. Secretary*—S. N. A. Jacobs. *Hon. Minuting Secretary*—H. G. Denvil. *Hon. Lanternist*—J. H. Adkin. *Council*—M. Niblett, F. J. Coulson, F.R.E.S., A. F. O'Farrell, R. Attwood, G. A. Brett, B.Sc., A.R.C.S., D.I.C., G. V. Bull, B.A., M.B., S. Wakely, F. D. Coote, F.R.E.S., G. R. Sutton, J. O. T. Howard, M.A.

The President then read his Address (see *Trans.*) and the new President, H. B. Williams, LL.D., F.R.E.S., took the chair.

Votes of thanks were passed to the retiring President, Officers and Council for their services during the past year.

ORDINARY MEETING.

Mr H. B. WILLIAMS, LL.D., F.R.E.S., President, in the Chair.

Mr S. Gordon-Smith, "Estyn," Boughton, Chester, was elected a member.

Mr C. N. Hawkins exhibited a specimen of *Heliothis armigera*, Hb., bred from a larva found in Tomatoes imported from the Canary Islands. The larva was given to him by Mr E. B. Britton of the Nat. Hist. Museum on 22nd November 1938, and was then full grown. It was forced at 65°-75° F., and the moth emerged on 15th December 1938. The specimen is rather a pale one and by daylight has a slightly olive tint on the forewings. On the hindwings the blackish clouding in the outer-marginal area is very well developed.

Mr Wallis-Norton exhibited a series of insects taken at the headlights of a car at Forest Row.

REPORTS OF FIELD MEETINGS.

26th MARCH 1938.

FIELD MEETING—EFFINGHAM.

Leader: Mr T. R. EAGLES.

This meeting was arranged for 16th April, but was advanced by three weeks owing to the forward condition of the season.

In the afternoon the party proceeded towards Ockham. The pine trees received most attention, but were not the sole interest seeing that galls of *Synanthedon* (*Aegeria*) *flaviventris*, Stdgr. and larvae of *Aegeria* (*Trochilium*) *apiformis*, Clerck, were secured. The latter were fully fed and resting ready to pupate. The mixed growth at the edge of the pine wood produced a beautiful form of *Peronea cristana*, Fabr. Other micro-lepidoptera were *Ornix avellanella*, Staint., *Gracillaria elongella*, L. and *Cacoecia leacheana*, L. Two larvae of *C. piceana*, L., were beaten out. One produced a fine male, the other being parasitized. Needless to say, the micro-lepidopterous pest, *Evetria buoliana*, Schiff. was present in the pine wood. Young larvae were seen and one young pine tree showed a most striking example of the "post horn" type of injury caused by the central bud having been destroyed by the larva.

The macro-lepidopterous larvae found on the pines were:—*Ellopiia fasciaria*, L. (*prosapiaria*, L.), *Thera obeliscata*, Hb., *T. firmata*, Hb. and *Aventia flexula*, Schiff., the last feeding on the close green alga on the boughs and as beautifully adapted for concealment in such surroundings as the first three are for hiding among pine twigs and needles.

The usual pine lady-birds were seen except that *Aphidecta oblitterata*, L. seemed to be absent.

Imagines of *Hemerobius stigma*, Steph. (Neuroptera) were abundant on the pines.

The coleopterists found *Rhagium bifasciatum*, F., *Elatер balteatus*, L., *Dorytomus taeniatus*, F. and a number of smaller species—none, however, of especial interest.

Larvae of *Perconia strigillaria*, Hb. were swept from the heather. Imagines of the moths, *Dichonia* (*Xylocampa*) *areola*, Esp., *Gymnoscelis pumilata*, Hb. and *Ectropis* (*Tephrosia*) *bistortata*, Göze were seen. This year *Panolis flammea*, Schiff. (*piniperda*, Panz.) (*griseo-variegata*, Göze) was not seen unless account be taken of one that had fallen victim to a spider.

After tea the party got ready their lamps and torches and inspected the sloe bushes. *Bapta distinctata*, H.-S. (*Aleucis pictaria*, Curt.) was present in numbers. At the same time the following other Geometrid moths were seen:—*Calostigia* (*Malenydris*) *multistrigaria*, Hw., *Theria rupicaprararia*, Schiff., *Selenia bilunaria*, Esp. and *Eorophila badiata*,

Schiff. The sallow catkins produced *Monima* (*Taeniocampa*) *munda*, Esp., *M. (T.) incerta*, Hufn., *M. (T.) stabilis*, View. and *M. (T.) pulverulenta*, Esp. Sixteen members attended.

Dates of previous Field Meetings:—1933.8.iv : 1934.7.iv : 1935.13.iv : 1936.11.iv : 1937.10.iv.

2nd APRIL 1938.

FIELD MEETING—BOOKHAM COMMON.

Leader: C. N. HAWKINS, F.R.E.S.

This meeting was originally arranged for 9th April but owing to the prolonged spell of fine and unusually warm weather experienced during March both vegetation and insect life had become so advanced that it was decided to alter the date to 2nd April. Even so, this proved to be all too late and most of the sallow bloom was far past being of any use as an attraction for moths. In striking contrast to the conditions at the corresponding meeting last year, when much of the area was either actually under water or too sodden to be workable, the ground was now so dry, even in the lowest parts, that there was no difficulty in working any portion of it. This made it all the more unfortunate that the sallow was so unproductive. The temperature, moreover, had dropped considerably so that although there was a fair amount of black-thorn blossom about, even that did not prove attractive.

On this occasion, in spite of the knowledge that the season was very early, 21 members and visitors attended the meeting and a varied bag was reported as evidenced by the lists given at the end of this report.

Tea was taken, as last year, at the Mark Oak Gate Tea Rooms, adjoining the Common on the Cobham Road, and proved a most enjoyable function.

Lists of Insects taken or noted:—

LEPIDOPTERA:—Imagines—*Dichonia* (*Xylocampa*) *areola*, Esp., *Calostigia multistrigaria*, Haw., *Coenotephria derivata*, Schiff. (*nigrofasciaria*, Göze), *Earophila badiata*, Schiff., *Eupithecia abbreviata*, Steph., *Bapta distinctata*, H.-S. (*pictaria*, Curt.), *Selenia bilunaria*, Esp. Larvae—*Synanthedon flaviventris*, Stgr., *Rhyacia triangulum*, Hufn., *R. brunnea*, Schiff., *Triphaena fimbria*, L., *T. comes*, Hb., *Meganephria* (*Miselia*) *oryzanthae*, L., *Laspeyria* (*Aventia*) *flexula*, Schiff., *Hemithea* (*Nemoria*) *aestivaria*, Hb. (*strigata*, Müll.), *Campaea margaritata*, L., *Crocallis elinguaris*, L., *Opisthograptis luteolata*, L., *Boarmia repandata*, L., *Laspeyresia* (*Hedya*) *servillana*, Dup., *Eucosma* (*Ephippiphora*) *pflugiana*, Haw. and *Coleophora genistae*, Staint., common on *Genista anglica*, L.

COLEOPTERA included:—*Dromius melanocephalus*, Dej., from sallow catkins; *Abax ater*, Vill., *Agonum obscurum*, Hbst., *Helophorus affinis*, Mm., *Gyrophæna strictula*, Er., *Bolitobius exoleta*, Er., *Baptolinus affinis*, Pz., *Necrophorus vespillo*, L., *Anisosticta 19-punctata*, L., *Exo-*

chomus quadripustulatus, L., *Cerylon histeroides*, F., *Scaphidium quadrimaculatum*, Ol., *Lochmaea crataegi*, Fourc., *Rhynchites aeneovirens*, Mm. and *germanicus*, Hbst., *Orchestes stigma*, Germ., *Dorytomus taeniatatus*, F., *dejeani*, Fst., and *melanophthalmus*, v. *agnathus*, Boh., *Bagous nigratarsis*, Thoms., *Coeliodes rubicundus*, Hbst. and *C. erythroleucus*, Gmel. All not previously reported. Lists were furnished by Dr Blair, and Messrs R. W. Attwood, F. D. Buck and D. W. Royffe.

HIRUDINEA:—The Medicinal Leech (*Hirudo medicinalis*, L.) was found in one of the ponds on the Common. This is supposed to be very rare in England. Dr Blair, however, said that his brother used to find them freely in the New Forest, but he raised the question as to what warm-blooded animals the Leeches in Bookham Pond could find to feed upon. (? Rabbits, Squirrels, small Rodents, etc.—C.N.H.)

Dr Blair also reported that three galls taken by him from willow stems all proved to be old galls of *Saperda populnea*, L.; one contained 3 cells of the Crabronid *Coelocrabro leucostomoides*, Rich., that had apparently been stocked with Dolichopodid flies; another, cells of *C. pubescens*, Shuck., the third a cast skin of a young earwig.

Dates of previous Field Meetings:—1932.17.v; 1934.9.vi; 1935.6.vii; 1937.17.iv.

10th APRIL 1938.

FIELD MEETING—BROADWATER FOREST.

Leader: Dr G. V. BULL, B.A.

The Field Meeting at Broadwater Forest was held at a considerably earlier date this year than usual as an experiment, advantage being taken of the Ramblers' Train of the Southern Railway.

Some interesting and unusually early captures were made in the Western portion of the Forest, which was worked before lunch. Afterwards the party made their way across to the High Rocks Hotel for tea at 5.30. Thirteen members were present. The weather was cool but bright.

The Macro-lepidoptera recorded were *Hesperia malvae*, L., *Anarta myrtilli*, L., *Eupithecia nanata*, Hb., *Semiothisa liturata*, Clrck., and *Ematurga atomaria*, L.; Larvae of *Synanthedon flaviventris*, Stdgr., *Ellopiia fasciaria*, L. (*prosapiaria*, L.), *Calostigia didymata*, L., *Aventia flexula*, Schiff., and *Thera firmata*, Hb., were secured. Of Micro-lepidoptera larvae of *Evetria pinicolana*, Dbldy., and *Laspeyresia* (*Enarmonia*) *conicolana*, Heyl., were found in fir cones, and also larvae of *Depressaria arenella*, Schiff. Imagines of *Lampronia quadripunctella*, Fb., and *Eulia politana*, Haw., were captured.

Mr F. D. Buck reported the following Coleoptera:—*Cicindela campestris*, L., *Lochmaea crataegi*, Forst., *Mysia oblongoguttata*, L., *Anatis ocellata*, L., *Calvia 14-guttata*, L., *Myrrha 18-guttata*, L., *Iathrobium geminum*, Kr., *Stenus nitidiusculus*, Steph., *Mycetophorus brunneus*, Marsh., *Strophosomus melanogrammus*, Forst., *S. capitatus*,

De G., *Phyllobius pyri*, L., *Rhinomacer attelaboïdes*, Fb., *Dromius meridionalis*, Dj., *Salpingus castaneus*, Pz., *Copelatus ruficollis*, Schal., *Scymnus suturalis*, Thnbg., *Anacaena globulus*, Pk.

Dates of previous Field Meetings:—1931.21.vi; 1932.19.vi; 1933.18.vi; 1934.17.vi; 1935.16.vi; 1936.14.vi; 1937.6.vi.

30th APRIL 1938.

FIELD MEETING—OXSHOTT HEATH.

Leader: Mr F. J. COULSON.

The weather was cold and the conditions windy, but the meeting was well attended, and the entomological fauna of this favourite locality was well explored by the twenty-six members and friends who were present. The species secured or observed well represented the locality, but in few cases could an individual species be regarded as abundant. Particular attention was paid to Micro-lepidoptera, and the following species were secured or observed:—*Lithocolletis cramerella*, F., *L. messaniella*, Zell., and *L. ulmifoliella*, Hb., *Buccatrix ulmella*, Zell., *Eriocrania sparmaniella*, Bosc., and *E. purpurella*, Haw., *Mnemonica subpurpurella* Haw., *Swammerdamia heroldella*, Hb., *Heliozela sericella*, Haw., *Gelechia ericetella*, Hbn.

Mr Wakely reported the capture of imagines of *Eucosma tetraquetra*, Haw., *Roeslerstammia exlebelli*, Fab., and *Eriocrania sparmaniella*, Bosc., and larvae of *Bombycis* (*Polia*) *viminalis*, Fabr., *Ipimorpha retusa*, L., *Coleophora viminella*, Zell., *Laspeyresia servillana*, Dup., *Argyresthia pygmaeella*, Hüb., *Enarmonia cruciana*, L., and *Limnecia phragmitella*, Staint. The last mentioned occurred commonly in *Typha* heads in a clay pit near the station. *Epermenia chaerophilella*, Göze, and *Dasycera sulphurella*, Fab.

Many species of Macro-lepidoptera were taken on the wing, resting on boles, or beaten from the bushes. From the boles were taken *Acronicta leporina*, L., *Dichonia* (*Xylocampa*) *areola*, Esp., *Lycia* (*Biston*) *hirtaria*, Cl., *Ectropis crepuscularia*, Hb., and *E. punctulata*, Schiff., *Eupithecia abbreviata*, Steph., and *Panolis flammea*, Hb. (*griseovariegata*, Goeze) (*piniperda*, Panz.). *Anarta myrtili*, L., *Chiasmia* (*Semiothisa*) *clathrata*, L., *Eupithecia nanata*, Hb., and *Ematurga atomaria*, L., were disturbed from the undergrowth, whilst beating bushes produced *Cosymbia* (*Leucophthalma*) *porata*, F., and *C. (L.) linearia*, Hb., *Cosymbia pendularia*, Clerck, and *Drepana lacertinaria*, L. *Bupalus piniaria*, L., was observed on the wing.

The windy conditions did not favour beating for Lepidopterous larvae, but *Campaea* (*Metrocampa*) *margaritata*, L., occurred commonly, and *Colotois* (*Himera*) *pennaria*, L., was beaten from elm. The larvae of *Amathis* (*Orthosia*) *lota*, Cl., were found tenanting willow shoots and a few of *Hipparchia* (*Geometra*) *papilionaria*, L., were taken. Larvae of *Lithosia complana*, L., and *Rhyacia* (*Noctua*) *baja*,

F., were found in a dry ditch amongst general debris. Galled twigs of willow caused possibly by *Synanthedon (Sesia) flaviventris*, Stdgr., and an ova ring of *Malacosoma neustria*, L., were also secured. The dry conditions, which rendered accessible the reed beds at the Black Pond, did not result in a good haul of larvae, as a considerable area of the reeds had been destroyed by fire in the previous month.

As regards Coleoptera, it was found that owing to the continued drought the stumps were too dry for beetles, though *Rhagium bifasciatum*, F., with some nice varieties, was waiting in its pupal chambers ready to emerge; and larvae of the same were plentiful. Under birch bark, usually in the vicinity of the black fungus, *Daldinia concentrica*, Ces. (in which also the larvae of *Myelois neophanes*, Drnt., were found), occurred the usual association of *Ditoma crenata*, F., *Litargus bifasciatus*, F., *Diphylus lunatus*, F., and *Cryptophagus ruficornis*, Steph., though in smaller numbers than usual. Search for moister conditions led to the investigation of the bottom of one of the ditches draining into the Black Pond, which were in a dried-up condition, and the shaking of old leaves, moss, grass, etc., over a newspaper proved to be more productive, producing as well as the *L. complana* noted above 24 species of beetles, including *Dyschirius globosus*, Hbst., *Stenus*, 5 spp., *Olophrum piceum*, Gyll., *Pselaphus heisei*, Hbst., *Cephennium thoracicum*, Müll., *Throscus carinifrons*, Bonv., etc.

In the reeds occurred *Coccidula scutellata*, Herbst, and on oak *Balaninus villosus*, F. The Black Pond was unproductive as regards water beetles, but the small isolated ponds and the ditches were tenanted by numbers of the usual commoner *Agabus*, *Ilybius*, *Rhantus*, and *Hydroporus*, as well as *Colymbetes fuscus*, L., and *Dytiscus marginalis*, L. *Cicindela campestris*, L., was observed on the wing but *C. sylvatica*, L., usually present, was not noted. Other coleopterous species taken were *Philonthus marginatus*, Str., *Silvanus unidentatus*, F., and *Cantharis pallida*, Göze. The usual common pine frequenting beetles were scarce.

The only Orthopteron taken was *Acrydium vittatum*, Zell., and *Troilus luridus*, Fb., was the only Heteropteron observed in any numbers.

From reed-stems collected the Hymenoptera *Chrysis cyanea*, L., and its host, *Trypoxylon attenuatum*, Smith, subsequently emerged.

Dates of previous Field Meetings:—1933.29.iv; 1937.15.v.

8th MAY, 1938.

FIELD MEETING—CUTT MILL, SURREY.

Leader: Mr F. STANLEY-SMITH, F.R.E.S.

The hospitality of Mr Holford, F.R.E.S., now a member of our Society, enabled us once again to visit the neighbourhood of the Cutt Mill Ponds. The day proved warm and sunny. In all 23 members and

visitors attended. The main party proceeded by private omnibus from Guildford station up on to the Hog's Back and down through Seale to the Ponds. There they scattered, working the heather, pines, birches or oaks according to choice, gathering together again at Elstead Lodge for a very welcome tea. Afterwards there was further collecting in our host's paddocks and gardens. Before departing, the President thanked Mr Holford for his hospitality, and the latter, in his reply, expressed the pleasure it gave him to meet members and the hope that he would see them again another year. The same bus then took the party back to Guildford station.

It was very noticeable how backward the oaks were in the neighbourhood as compared with other places only two or three miles away. It was too early in the season to be very fruitful of insects. Omitting the very common ones and those recorded in our two previous reports from the locality, the insects taken were:—

LEPIDOPTERA:—Imagines—*Acronicta leporina*, L., *Anarta myrtilli*, L., *Eupithecia tantillaria*, Bdv. (*pusillata*, Fabr.), *Eriocrania sparmanella*, Bosc., *Swammerdamia heroldella*, Hb., *Lithocolletis frolichella*, Zell. Larvae—*Hylophila bicolorana*, Fuessl., *Plusia chrysitis*, L., *Pseudoterpna pruinata*, Hufn., *Boarmia (Cleora) lichenaria*, Hufn., *Boarmia roboraria*, Schiff.

COLEOPTERA:—Imagines—*Atheta aequata*, Er., *Lathrimaeum unicolor*, Stèph. (from rabbit burrows). *Chilocorus*, both spp., *Ditoma crenata*, F., *Meligethes lumbaris*, Strm., *Glischrochilus quadripunctatus*, Ol., *Agriotes acuminatus*, Steph., *Dasytes aerosus*, Kies., *Cyphon padi*, L., *Pogonochaerus hispidus*, L., *Galerucella lineola*, F. and *G. sagittariae*, Gyll., *Salpingus castaneus*, Pz., *Attelabus nitens* Scop., *Rhynchites aeneovirens* Mm., *Phyllobius* spp., *Sitona regensteiniensis*, Hbst., *Orchestes pilosus*, F., *O. rusci*, Hbst., *O. stigma*, Germ., *Dorytomus taeniatus*, F., *Anoplus plantaris*, Nacz., *Coeliodes* spp., *Balaninus nucum*, L., *B. venosus*, F. and *B. villosus*, F.

In addition, larvae of *Tomoxia biguttata*, Gyll. were dug out of the old birch stumps, on which the imagines were found on a previous occasion; also pupae of *Melandrya caraboides*, L. (uncommon).

Dates of previous Field Meetings:—1936.21.vi; 1937.20.vi.

14th MAY, 1938.

FIELD MEETING—HORSLEY.

Leader: Mr F. D. COOTE, F.R.E.S.

Sixteen members and three visitors attended this meeting. From the station the field path by the railway line and then through the meadows to the Guildford Road was followed. A short distance along the main road the entrance to the Sheep Leas was reached. There was a lack of sunshine, otherwise more captures would have been made. Netley Heath was not visited on this occasion.

Captures reported included:—

LEPIDOPTERA:—*Euclidia mi*, Clerck, *E. glyphica*, L., *Prothymia viridaria*, Clerck (*aenea*, Hbn.), *Leucophthalmia linearia*, Hubn. (*trilinearia*, Borkh.), *Anaitis plagiata*, L., *Asthena candidata*, Schiff., *Pseudopanthera temerata*, Hbn., *Laspeyresia perlepidana*, Haw., *Telphusa sequax*, Haw. (larvae), *Mompha miscella*, Schiff. (larvae), *Panalia leuvenhockella*, L., *Plutella maculipennis*, Curt.

The Hemipteron *Aradus depressus*, F. was also reported.

COLEOPTERA:—*Dromius quadrimaculatus*, L., *Cercyon littoralis*, Gyll., *Astenus immaculatus*, Steph., *Anisotoma humeralis*, F., *Endomychus coccineus*, L., *Calvia 14-guttata*, L., *Myrrha 18-guttata*, L., *Exochomus quadripustulatus*, L., *Mycetophagus quadripustulatus*, L., *Byrrhus fasciatus*, F., *Cytilus sericeus*, Först., *Trox sabulosus*, L., *Aphodius ater*, De G., *Agriotes acuminatus*, Steph., *Dasytes aerosus*, Kies., *Laria rufipes*, Hbst., *Gastroidea polygoni*, L., *Lochmaea crataegi*, Fourc., *Haltica palustris*, Wse., *Hermæophaga mercurialis*, F., *Gonodera luperus*, Hbst., and var. *ferruginea*, F., *Asclera coerulea*, L., *Rhynchites aequatus*, L., *Sibinia potentillae*, Germ., *Acalles turbatus*, Boh.

Dates of previous Field Meetings:—1930.31.viii; 1936.14.v.

22nd MAY 1938.

FIELD MEETING—ISLE OF WIGHT.

Leader: Mr S. WAKELY.

The expedition to the Island proved again very popular. The party travelled from Waterloo by one of the Southern Railway's Special "Ramblers'" Excursions, two compartments being reserved for the "South London."

It was once more decided to work the cliffs to the east of Sandown, so the party left the train at Brading. Instead of going via the marshes to the cliffs, as last year, it was decided to take the road to Bembridge as far as Bembridge Down, and then proceed along the southern slope to the Culvers. This was a very lucky choice, as *Melitaea cinxia*, L., was spotted as soon as the Down was reached. Many of the members had not seen this butterfly on the wing previous to this occasion, and it was gratifying to see it in such numbers. Those who wanted it were able to take as many as they desired, and one member was heard to remark, in reference to its abundance: "I shall always think of *brassicae* when the name of *cinxia* is mentioned!"

Cupido minimus, Fuessl., and *Polyommatus (Lycaena) bellargus*, Rott., were flying on the downs, but were by no means common.

After lunch, a move was made to the broken cliffs, where the members spread out, some of the coleopterists being particularly interested in the marshy ground.

The webs of the Phycitid moth, *Nephoteryx genistella*, Dup., were found on gorse, the larvae being nearly full-fed. The Plume, *Adaina microdactyla*, Hb., was also quite common in a small clump of *Eupatorium cannabinum*, L., and a bundle of the galled stems produced moths over a period of three or four weeks, the numbers that emerged exceeding all expectations. Another local Plume, *Pterophorus carphodactylus*, Hb., was taken flying (one specimen), and a search revealed the larvae present in the crowns of its food-plant *Inula conyza*, DC. Larvae of *Nygma* (*Euproctis*) *phaeorrhoea*, Haw., were to be seen in webs on hawthorn.

The weather was perfect, a welcome change after a period with chilly winds that was causing a scarcity of insects.

Several visitors joined the party, and exactly twenty sat down to tea, which was enjoyed at Sandown, whence the return journey was commenced.

A detailed list of further captures follows:—

COLEOPTERA:—*Amara lucida*, Dufts., and *similata*, Gyll., *Dyschirius globosus*, Hbst., *Bembidion genei*, var. *illigeri*, Netol. (*quadriguttatum* of our lists), *Metabletus obscuroguttatus*, Dufts., *Megemyleurus rugosus*, Ol., *Quedius semiaeneus*, Steph., *Stilicus similis*, Er., *Thea 22-punctata*, L., *Hyperaspis reppensis*, Hbst., *Aphodius haemorrhoidalis*, L., *Cantharis rustica*, Fall., *Psilothrix cyaneus*, Ol., *Grammoptera ruficornis*, F., *Cryptocephalus aureolus*, L., *Cassida fastuosa*, Schall. (ova and larvae), *Opatrum sabulosum*, L., *Isomira murina*, L., *Anthicus antherinus*, L., *Oedemera nobilis*, Scop., *Apion rufirostre*, Fhs., *A. ononis*, K., *A. varipes*, Germ., *A. apricans*, Hbst., *A. radiolus*, K., *A. ervi*, K., *A. urticarium*, Hbst., *Otiorrhynchus ligneus*, Ol., *Trachyploeus spinimanus*, Germ., *Cneorrhynchus plagiatus*, Schall., *Erirrhinus festucae*, Hbst., *Ceuthorrhynchidius troglodytes*, F., *Magdalis armigera*, Frc., and many others.

Some dozen species of common water beetles were taken from the pool on the undercliff, but nothing worthy of note.

LEPIDOPTERA:—*Panemeria tenebrosa*, Scop., *Euclidia mi*, Clrek., *Chiasmia clathrata*, L., *Aspitates* (*Crocota*) *ochrearia*, Ross., *Vanessa atalanta*, L., *Coenonympha pamphilus*, L., *Aricia agestis*, Schiff. (*astrarche*, Brgstr.) (*medon*, Hufn.), *Polyommatus icarus*, Rott., *Euchloë cardamines*, L., *Pieris napi*, L., *Nisoniades* (*Hesperia*) *tages*, L., and larvae of *Lygris populata*, L., off *Galium*.

Of other Orders *Chrysis ignita*, L. (♂) (Hym.) was taken on a telegraph pole. *Podops inuncta*, F., *Piesma maculata*, Fieb., and *Cymus claviculus*, Fall. (Hem.) were swept.

Galls of the Trypetid, *Myopites blottii*, Bréb., from which parasites had already emerged, but which still contained larvae of the Trypetid, were found on last year's flower heads of *Inula dysenterica*, Grtn.

Date of previous Field Meeting:—1937.30.v.

12th JUNE, 1938.

FIELD MEETING—ASCOT.

Leader: Mr L. H. ENNIS.

About a dozen members attended this meeting, held in what was, for most, a new locality. Unfortunately, however, the day was marred by the fact that the extensive stretches of heather country had recently been destroyed by fire. Collecting was, therefore, almost entirely confined to the woodlands which, as far as Lepidoptera were concerned, produced nothing unusual.

The most interesting capture was undoubtedly that of a Dipteron (*Laphria gilva*, L.) by Mrs Blair—a species new to the British list. A notable feature also was the enormous swarms of the common Cockchafer in Ascot, on the foliage, fences, and on the ground.

The following is a list of captures made, as far as they have been determined to date:—

LEPIDOPTERA:—Imagines—*Vanessa atalanta*, L., *Brenthis selene*, Schiff., *Pararge megera*, L., *Polyommatus icarus*, Rott., *Hesperia malvae*, L., *Agrotis puta*, Hb., *Eulype hastata*, L., *Ectropis extersaria*, Hb. (*luridata*, Bork.), *Pseudopanthera macularia*, L., *Boarmia punctinalis*, Scop. (*consortaria*, Hb.), *Xanthorhoë montanata*, Schiff., *Lithina chlorosata*, Scop. (*petraria*, Gn.), *Cosymbia porata*, L., ab. *punctularia*, Lambl., *C. linearia*, Hb., *Eupithecia tantillaria*, Bdv. (*pusillata*, Hb.), *E. lariciata*, Frr., *Bupalus piniaria*, L., *Hydrelia flammeolaria*, Hufn. (*luteata*, Schiff.), *Synanthedon culiciformis*, L., *Crambus ericellus*, Hb. Larvae—*Scopelosoma satellitia*, L., *Monima incerta*, Hufn., *M. stabilis*, View., *Panolis flammea* (*piniperda*, Panz.), *Brephos parthenias*, L., *Apocheima hispidaria*, Schiff., *Phigalia pediaia*, Fb.

COLEOPTERA:—*Carabus violaceus*, L., *Elaphrus riparius*, L., *E. cupreus*, Duft., *Loricera pilicornis*, F., *Acupalpus dorsalis*, F., *Anisodactylus binotatus*, F., *Abax ater*, Vill., *Bembidion rupestre*, L., *B. dentellum*, Thbg., *B. obliquum*, Steph., *Agabus chalconatus*, Pz., *Anisotoma humeralis*, F., *Xylodrepa quadripunctata*, L., *Myzia oblongoguttata*, L., *Anatis ocellata*, L., *Silvanus unidentatus*, F., *Dorcus parallelipedus*, L., *Phyllopertha horticola*, L., *Elatер balteatus*, L., *Prosternon holosericeus*, Ol., *Podabrus alpinus*, Pk., *Cantharis pallida*, Gze., *C. figurata*, Mann., *Dasytes aerosus*, Kies., *Grynobius excavatum*, Kl., *Rhagium bifasciatum*, F., *R. mordax*, De G., *Stenochorus meridianus*, Pz., *Leipus nebulosus*, L., *Tetrops praeusta*, L., *Cryptocephalus parvulus*, Müll., *Lochmaea crataegi*, Först., *Gonodera luperus*, Hbst., *Attelabus nitens*, Scop., *Anthonomus pedicularius*, L.

18th JUNE, 1938.

FIELD MEETING—BOX HILL.

Leader: H. G. TUNSTALL.

This meeting was attended by fourteen members and a visitor on a day which was close and cloudy with very little sunshine. The morning

party worked from Box Hill station over the flank of the hill and the zig-zag to Juniper Valley, where lunch was taken. In the afternoon the party divided, some going to Mickleham and others working up the valley and back over the hill to the Railway Hotel, where all met for the usual enjoyable tea. Those who remained after tea worked the southern slopes of the hill.

No new additions to the Box Hill list were made, but the most noteworthy captures were:—

COLEOPTERA:—*Lucanus cervus*, L. (3♂.1♀), *Cionus alauda*, Hb., *C. hortulanus*, Gf., *Dorytomus rufulus*, Bb., *Strangalia melanura*, L., *Carabus violaceus*, L., *Dascillus cervinus*, L., *Molorchus minor*, L.

LEPIDOPTERA:—Larvae—*Sphinx ligustri*, L., *Lithosia deplana*, Esp., *Monima munda*, F., *Tephrosia biundularia*, Esp., *Brephos parthenias*, L., *Ciduria siterata*, Hufn., *Boarmia abietaria*, Schiff., *Geometra vernaria*, Hb., *Lobophora carpinata*, Bkn., *L. viretata*, Hb., *L. polyommata*, Hb., *Zelleria hepiarella*, Staint., *Gracillaria semifascia*, Haw. Imagines—*Nola confusalis*, H.-S., *Lithosia sororecula*, Hufn., *Xylophasia sublustris*, Esp., *Dyschorista corticea*, Hb., *Hydriomena corylata*, Thnbg., *Acidalia ornata*, Scop., *Semiothisa liturata*, Ckck., *Lithacodia fasciana*, L., *Hepialus humuli*, L., *Pyrausta cingulata*, L., *Platytes alpinellus*, Hb., *Oxyptilus parvidactylus*, Haw., *Coleophora niveicostella*, Zell., *Argyresthia illuminatella*, Zell.

The following Orchids were also recorded:—

Ophrys apifera, Huds., *Listera ovata*, L., *Aceras anthropophora*, Br., *Orchis maculata*, L., *Cephalanthera latifolia*, Sw., *Gymnadenia conopsea*, Br.

Dates of previous Field Meetings:—1931.25.vii; 1932.23.vii; 1934.15.ix; 1935.11.v; 1937.26.vi; 25.viii.

19th JUNE 1938.

FIELD MEETING—NEW FOREST.

Leader: Mr F. D. COOTE, F.R.E.S.

When the list of Field Meetings was published several members expressed regret that no visit had been arranged to the New Forest, and as the Ramblers' Association was having an excursion to the western edge of the Forest, near Fordingbridge, on the River Avon, enquiries were made of Mr Nagle, who lives at Picket Post, near Ringwood, as to the possibilities of that district. He was so good as to send very full information, and as a result it was decided to visit Braemore in the Forest. A compartment was reserved for our party on the Ramblers' train, and after a comfortable journey we arrived at about 11.30. Three members of the Society, who were staying in the Forest at the time, met the nine who had come by train. Leaving the station, the road to Oakhill enclosure, our destination, led across the water meadows of the river Avon, and there a specimen of *Callimorpha domi-*

nula, L., was captured. In the woods one *Limenitis camilla*, L. (*sibilla*, L.) was taken, but it was evidently too early for the large fritillaries. On the return journey to Braemore *dominula* was found flying in considerable numbers, and Mr Ennis captured a remarkable variety. A very enjoyable tea was taken at the Bat and Ball, and before joining the train home another visit was paid to the water meadows.

In addition to the insects named above, the following lepidoptera were reported:—*Moma alpium*, Osb. (*orion*, Esp.), *Lasiocampa quercus*, L. (larva), *Atolmis rubricollis*, L., and *Spilosoma urticae*, Esp. Mr Burton captured a ♀ *Colias croceus*, Fourcroy, but unfortunately ova subsequently obtained proved infertile. Mr A. O'Farrell was fortunate in netting the rare New Forest dragonfly *Agriion mercuriale*, Charp.

Date of previous Field Meeting:—1936.28.vi.

26th JUNE 1938.

FIELD MEETING—FOREST ROW.

Leader: H. G. DENVIL.

Ten members and two visitors attended this meeting, which was favoured by fine weather. The ground worked was that which lies to the West of the main road towards the stream. Insects were not very numerous, and some species which are usually taken, such as *Limenitis camilla*, L., and *Diacrisia sannio*, L., were decidedly scarce.

Owing to the lack of rain it was possible to work along the stream in places which are usually inaccessible, assuming that one could endure the attentions of the Diptera, the only Order whose representatives were really common. Several species of Coleoptera were taken on the muddy banks.

On the further side of the stream, where the ground had been severely burnt, some of the commoner species of grasshopper, mostly immature, were found over a small area, but, otherwise, insects appeared to be scarcer than elsewhere. The party worked back over the same ground to Forest Row, where tea was taken, after which, as there was adequate time before the return train was due, it was decided to work the fields on the further side of the railway. Here the party was joined by another member, who had arrived later in the day. After working over these fields for some time a move was made back to the station, and so homewards. Although, on the whole, the results were not very good, all the members appear to have obtained something for their labours.

The following list represents the species seen or taken:—

LEPIDOPTERA:—Imagines—*Limenitis camilla*, L., *Brenthis selene*, Schiff., *Coenonympha pamphilus*, L., *Maniola jurtina*, L., *Plebeius aegon*, Schiff. (*argus*, L.), *Drepana falcatoria*, L., *Diacrisia sannio*, L., *Acronicta psi*, L., *Cybosia mesomella*, L., *Palimpestis fluctuosa*, Hb., *Anarta myrtilli*, L., *Hemistola chrysoprasaria*, Esp. (*Geometra vernaria*, Hb.), *Lithacodia pygarga*, Hufn. (*Erastria fusciana*, L.), *Rivula seri-*

cealis, Scop., *Prothymnia viridaria*, Clrck., *Comibaena* (*Euchloris*) *pustulata*, Hufn., *Cidaria corylata*, Thnbg., *Cidaria fulvata*, Frst., *Xanthorhoë montanata*, Schiff., *Cabera exanthemata*, Scop., *Campaea* (*Metrocampa*) *margaritata*, L., *Bupalus piniaria*, L., *Perconia strigilaria*, Hb., *Tortrix viridana*, L. Larvae—*Sarothripus undulana*, Hb. (oak), *Polyploca flavicornis*, L. (birch), *Lithosia deplana*, Esp. (lichen on yew), *Nola cuculatella*, L. (hawthorn), *Pygaera pigra*, Hufn. (aspen), *Selenia bilunaria*, Esp. (birch), *Panolis flammea*, Hb. (*piniperda*, Panz. = *griseo-variegata*, Göze).

COLEOPTERA:—*Elaphrus cupreus*, Duft., *Bradycellus verbasci*, Duft., *B. similis*, Dj., *Dromius linearis*, Ol., *D. 4-maculatus*, L., *Helophorus affinis*, Marsh., *Baptolinus affinis*, Pk., *Coccinella hieroglyphica*, L., *Phalacrus coruscus*, Pk., *Aspidiphorus orbiculatus*, Gyll., *Cyphon coarctatus*, Pk., *Denticollis* (*Campylus*) *linearis*, L., *Cantharis fulvicollis*, Fb., *Malthinus flaveolus*, Payk., and *balteatus*, Suffr., *Malachius marginellus*, Ol., and *bipustulatus*, L., *Strangalia maculata*, Poda (armata, Hbst.), *Plateumaris* (*Donacia*) *sericea*, L., *Cryptocephalus labiatus*, L., *Rhynchites nanus*, Pk., *Polydrosus terecollis*, De G., *Phyllobius argentatus*, L., *P. calcaratus*, F., *Oneorhinus exaratus*, Marsh., *Orchestes salicis*, L., *Tychius tibialis*, Boh., *Anthonomus rubi*, Hbst., *Balanobius* (*Balaninus*) *pyrrhoceras*, Marsh., *Rhinoncus pericarpus*, L., *Smicronyx jungermanniae*, Reh.

ORTHOPTERA:—*Meconema thalassinum*, De G., *Leptophyes punctatissima*, Bosc., *Chorthippus bicolor*, Chrp., *Myrmeleotettix maculatus*, Thnbg.

HYMENOPTERA:—An outstanding capture of the day was the Braconid *Helcon ruspator*, L., at rest on a dead trunk, the only previous British record of this species being from Cannock Chase in 1910. *Rhopalum clavipes*, Steph., was also taken.

Dates of previous Field Meetings: — 1932.10.vii; 1933.9.vii; 1934.5.vii; 1935.30.vi; 1937.4.vii.

3rd JULY 1938.

FIELD MEETING—WITLEY.

Leader: Mr F. D. COOTE, F.R.E.S.

This district was last visited by the Society in May 1925, when the route followed was from Milford Station to Hambledon and Highdown Ball, the opportunity being taken to visit Mr Joicey's Museum at Hill House. On the present occasion a start was made from Witley Station, but the party was very small, only five members. The first item of interest was a spotted flycatcher, which, however, declined to join our party. Crossing the main road it was found that the grounds of Hill House were being cut up for building and from large patches of foxgloves larvae of *Eupithecia pulchellata*, Stph., were taken. The party being small, it was decided to vary the proposed route and to visit some

woods half-a-mile further south near the footpath to Hambledon. Tracks in many directions led through extensive woods and a clump of aspen furnished larva of *Pygaera curtula*, L. We spent most of our time in these woods and, though possibly trespassing, met with no obstructions or irate gamekeepers. In the few gleams of sunshine freshly-emerged *Argynnis paphia*, L., and *Polygonia c-album*, L., were captured or seen. A nesting hole, partly filled in with mud, of the Nuthatch was observed. When we reached Hambledon village it was time for tea, and an excellent repast was furnished at the "Hare and Hounds." It was too late, however, to avail ourselves of the permission kindly given by Mr Eric Parker to work in his woods near High-down Ball, and a return to Witley Station was made through Buss's Common and Hambledon Common. These two commons adjoin and consist of heather, bilberry, birch, oak, pine, buckthorn, etc. Though not much in the way of captures was recorded, a very enjoyable time was spent, and all agreed that the district was one of great possibilities. Of course, had our party been bigger it might not have been so easy to trespass in the woods, though it is understood that permission can be obtained to work in them.

Mr R. A. Attwood reported a half-grown *Gonepteryx rhamni*, L., larva attacked by a Pentatomid Bug. The larva was alive, but appeared numbed. The beak of the Bug was inserted just below the head of the larva on the right side. Even when the larva was picked off the Buckthorn leaf, the Bug did not leave its victim. The Bug was chocolate brown in colour, with a red spot in centre of the scutellum.

The Grasshopper, *Myrmecotettix maculatus*, Kirby, was abundant in a small rabbit eaten area of grass in the midst of the heather. There were some very fine forms, the white crescent on the elytra being very noticeable.

LEPIDOPTERA:—Imagines—*Ptychopoda aversata*, L., *Boarmia repandata*, L. (melanic), *Maniola jurtina*, L., *M. hyperantus*, L., *Coenonympha pamphilus*, L., *Lycaena icarus*, Rott. (first brood nearly over), *Thymelicus thaumas*, Hufn. Larvae—*Euchloë cardamines*, L.

ODONATA:—*Agrion virgo*, L., *Ischnura elegans*, Lind.

COLEOPTERA included the following:—*Cionus alauda*, Hb., *Necrophorus vespilloides*, Hb., *Xylodrepa quadripunctata*, L., *Chalcoides plutus*, Lt., *Antherophagus nigricornis*, F., *Stenus cicindeloides*, Gr., *Ditoma crenata*, F., *Adonia variegata*, Gr., *Leptura cerambyciformis*, Sk., *Pterostichus niger*, Sl., *Hydrobius fuscipes*, L., *Helophorus walkeri*, Sh., *Silvanus unidentatus*, F., *Sciaphilus asperatus*, Bf.

10th JULY 1938.

FIELD MEETING—SOUTH BENFLEET, ESSEX.

Leader: R. W. ATTWOOD.

Twenty-three members and two visitors attended. The weather was

dull with a strong south-west wind which made collecting on the Marshes rather unpleasant.

Dr Stovin, our local member, who is also President of the South Essex Natural History Society, met us at the Railway Station and was good enough to conduct the party along the sea wall. As he was unable to be with us all the time, Mr Huggins had kindly agreed to act as his representative for the local Society during the afternoon and to show us the new Nature Reserve, which, chiefly owing to the hard work and persuasive powers of Dr Stovin and the other members of the South Essex Natural History Society, has been acquired by the Southend Corporation.

The party proceeded through the disused railway siding to the sea wall. All four stages of *Euchloris smaragdaria*, Fb. were found on the Sea Wormwood, the larvae, of course, being very small. *Satyrus* (*Melanargia*) *galathea*, L. was taken sparingly, but Mr Moore, who worked the rough hillside, reported that it was very plentiful there, and that *Adopoea lineola*, Ochs., also occurred, the latter, however, being very scarce. He also reported finding a nest of the Humble Bee, *Bombus lucorum*, Smith.

The micro-lepidopterists stayed in the railway siding for some considerable time and secured a large number of species. Larvae and pupae of *Eucosma foenella*, L. were very common in the old shoots of the common wormwood. They were mostly low down in last year's stems, just above ground level, and were easily obtained by breaking off these stems which usually snapped near the larva or pupa.

The Reed stems along the dykes were examined and several larvae and pupae of *Nonagria geminipuncta*, Hatch. were obtained as well as one larva of *Chilo phragmitellus*, Hbn. The local Dragon Fly, *Lestes dryas*, Krby. was also seen along the dykes.

The Grasshoppers were very backward compared with last year. *Metrioptera roeselii*, Hagnbk. was seen but was immature, as were most of the species noted.

A number of the party left the Marshes about lunch-time and went to meet Mr Huggins at the Nature Reserve. Unfortunately, a slight rain set in, which interfered somewhat with the collecting in this area, but a considerable number of species were taken or noted. Our members were very favourably impressed with the terrain. *Phlyctaenia* (*Botys*) *fuscalis*, Schiff. was abundant, *Eupithecia plumbeolata*, Haw. common in one particular spot and scattered sparingly elsewhere. *Melitaea athalia*, Rott. was seen, but Dr Stovin and Mr Huggins report it as very scarce this year.

The pretty little Rosy Footman, *Miltochrista miniata*, Forst. was also taken.

An interesting case-bearing larva, *Coleophora saturatella*, Stain. was taken in some numbers off broom. The larval case is black and conspicuous on the green shoots of the broom, but it is surprisingly difficult to find until one's eyes get accustomed to it.

Galls of a beetle, *Mecinus collaris*, Germ., were fairly plentiful on sea plantain and a Cynipid gall, *Aulacidea hypchoeridis*, Kie. on cat's ear was the most interesting noted during the day.

After tea, which was held at the Hoy Inn, some of the members again went to the Marshes and took further larvae and also a female *Euchloris smaragdaria*, which was ovipositing on the sea wormwood.

The most striking capture of the day was a specimen of *Pyrausta (Botys) nubilalis*, Hb., taken by Mr S. Wakely on the Marshes. Meyrick, in his "Revised Handbook of British Lepidoptera," says the species is "probably a casual immigrant only." Since the meeting, Mr Huggins has again visited the area and taken several further specimens, an account of which is published in "The Entomologist," Vol. LXXI, p. 241 (1938).

The following is a list of the additional species, not previously recorded from this locality, taken or noted:—

LEPIDOPTERA:—*Arctia caja*, L., *Malacosoma (Clisiocampa) neustria*, L. (larva), *Cosmotriche (Odonestis) potatoria*, L. (ova), *Erastria pygarga*, Hufn. (*fasciana*, L.), *Ptychopoda trigeminata*, Haw., *Eupithecia absinthiata*, Clrck., *Ortholitha chenopodiata*, L., (*Xanthorhoë limitata*, Scop.), *Angerona (Euchlaenia) prunaria*, L., *Pygaera curtula*, L. (larva), *Homoeosoma sinuella*, Fb., *Acrobasis consociella*, Hb., *Pterophorus lienigianus*, Zell., *Zygaena trifolii*, Esp., *Euxanthis aeneana*, Hb., *Hedya (Gypsonoma) dealbana*, Fröl., *Eucosma citrana*, Hb., *E. brunnichiana*, Fröl., *Hemimene petiverella*, L., *H. alpinana*, Tr., *H. alpestrana*, H.-S., *H. simpliciana*, Haw., *Phthorimaca instabilella*, Dgls., *Brachmia rufescens*, Haw., *Coleophora conspicuella*, Mann. (larva), *C. saturatella*, Stain. (larva), *Gracillaria alchimiella*, Scop.

COLEOPTERA:—Other beetles of interest were *Demetrias imperialis*, Germ. from the reeds, *Bledius spectabilis*, Kr., *Bembidion varium*, Ol., *B. iricolor*, Bed. from the muddy margins of the ditches, *Pogonus chalceus*, Mm. from tidal rubbish and *Tychius meliloti*, Steph. and *Sitona cylindricollis*, Fhs. from the railway sidings.

Dates of previous Field Meetings:—1933.16.vii; 1935.14.vii; 1936.12.vii; 1937.18.vii.

16th JULY 1938.

FIELD MEETING—CHALFONT AND LATIMER.

Leader: Dr K. G. BLAIR, F.R.E.S.

On account of the limited area to be worked the meeting was arranged for the afternoon only. Though rain fell steadily all the way down from Baker Street, it most fortunately ceased as the party arrived at Chalfont and Latimer station, and dull weather, though without further rain, prevailed for the afternoon.

Owing to the lateness of our visit *Discoloxia blomeri*, Curt. was not to be seen, and diligent searching and beating alike failed to reveal even

young larvae. *Abraxas sylvata*, Scop., however, was still fairly plentiful on the low herbage, and fertile ova were obtained from a crippled female. A search for larvae of *Calocalpe cervinalis*, Scop. (*certata*, Hb.) on a hedge of *Berberis* produced but one, though that they had been not uncommon a little earlier was evidenced by the number of empty "houses" found. Among other Lepidoptera observed were *O. camolina*, L., *Apamea gemina*, Hb., *Campaea margaritata*, L., *Hydriomena furcata*, Thnbg. (*sordidata*, F.) and larvae of *Ennomos quercinaria*, L. and *Cosymbia linearia*, Hb.

Coleoptera noticed included *Priobium excavatum*, Klug, *Apion cracca*, L., *Cionus hortulanus*, Geoffr. and the Coccinellid, *Propylea 14-punctata*, L. (*Synharmonia conglobata*, erron. of our lists) and its larvae. The Neuropteran, *Micromus variegatus*, F. was swept in small numbers from the roadside vegetation.

Tea was obtained about 6.30 at The Sugar Loaves near the station.

The attendance was below average, six members only being present.

Dates of previous Field Meetings: — 1930.12.vii; 1931.11.vii; 1932.31.v; 1934.30.vi; 1936.4.vii.

30th JULY 1938.

FIELD MEETING—CHIPSTEAD.

Leader: Mr R. J. COLLINS.

This is the second occasion that the Society has arranged a Field Meeting in this district, the previous date being in June 1900. Seven members met at Chipstead Station in glorious weather and proceeded through the Long Plantation to Mugswell. Very few insects were observed, though members were of the opinion that if systematically worked the district should be very profitable. After lunch members returned to Chipstead, exploring the fields in the valley, a good and promising country. One *Colias croceus*, Frery. was seen on the railway bank, but it eluded capture. After tea at Chipstead the party proceeded by field paths to Kingswood.

7th AUGUST 1938.

FIELD MEETING—BYFLEET.

Leader: Mr A. HARRIS.

Nine members attended on a grey morning, which gradually turned greyer and wetter and finished in a downpour. A little beating was done beside the canal bank towards Woking but only very few and common insects were forthcoming. Nothing of note was taken and as the beating trays became heavy with rain there was nothing more to be done. Of Coleoptera *Melasoma populi*, L. was taken in all stages except ova, feeding on aspen. Apart from this little was seen.

A bedraggled party withdrew from the field at about 3 p.m. almost empty handed.

Dates of previous Field Meetings: — 1930.26.vii; 1933.29.vii; 1935.8.ix; 1936.12.ix; 1937.24.vii.

13th AUGUST 1938.

FIELD MEETING—ASHTHEAD.

Leader: B. S. GOODBAN.

Present 11 members and one visitor. Weather average. No rain. This locality has presented a somewhat poor field for larvae this year and to-day was no exception. The only larvae worth recording are those of *Notodonta ziczac*, L., *Euclidia glyphica*, L. and *Theretra* (*Metopsilus*) *porcellus*, L., two or three of which last were found after diligently searching the bedstraw and one *Euphyia cuculata*, Hufn.

Of imagines, an interesting capture was a specimen of *Rumicia* (*Heodes*) *phlaeas*, L., approaching var. *schmidtii*, Grh., *Thecla quercus*, L. was also taken, while *Vanessa cardui*, L. and *Argynnis cydippe*, L. (*adippe*, L.) were observed rather worn. *Metachrostis perla*, Fb. was removed in some numbers from the railway bridge and *Nomophila noctuella*, Schiff. was common. Other captures included *Miana strigilis*, Clrck., *Leucania impura*, Hb., *Iodis lactearia*, L., *Petilampa arcuosa*, Haw., and *Ilorisme* (*Phibalapteryx*) *tersata*, Schiff.

The Coleoptera not previously recorded are as follows:—*Baptolinus affinis*, Pk., *Stenus flavipes*, S., *Ceryon impressus*, St., *C. pygmaeus*, Il., *Adonia variegata*, Gz., *Anatis ocellata*, L., *Cerylon histeroides*, F., *Pria dulcamarae*, Sc., *Scaphidium quadrimaculatum*, Ol., *Cryptophagus acutangulus*, Gyll., *Lema puncticollis*, Ct., *Cryptocephalus fulvus*, Gz., *Cassida vibex*, L., *C. rubiginosa*, Mul., *Rhinosimus planirostris*, F., *Attelabus nitens*, Sp., *Apion carduorum*, K., *A. difforme*, Gm., *A. striatum*, K., *A. curtirostre*, Gm., *Polydrosus flavipes*, Dg., *Orchestes rusci*, Hbst., *O. avellanae*, Do., *Balaninus glandium*, Mm., *B. venosus*, Gr., *Balanobius pyrrhoceras*, Mm., *Coeliodes erythroleucus*, Gl.

21st AUGUST 1938.

FIELD MEETING—EYNSFORD.

Leader: Mr S. N. A. JACOBS.

On arrival at the selected spot, the old gun-testing range, it was found that this piece of ground had been closed to the public, and the party accordingly withdrew to test the hills on the National Trust ground overlooking Shoreham station from the North side. Here members spread out to work, and in spite of the dryness many species were observed; *Polygonommatus coridon*, Poda was plentiful and in all thirteen species of butterfly were noted; three *Colias croceus*, Frery., all males,

were taken, but as they were not in cabinet condition, they were duly released.

In the afternoon, the party returned towards Eynsford, where, on a clover field which is being broken up for building, one or two more *C. croceus* were noted, but here again condition was past its best and they were released. About this time, a heavy storm threatened, and the tea garden was sought. The party broke up after an energetic day under the August sun, and an early departure for home was made.

27th AUGUST 1938.

FIELD MEETING—MICKLEHAM DOWNS.

Leader: Mr S. WAKELY.

Holmwood was the place down on the fixture card for the Field Meeting on this date, but a preliminary survey of the locality was unpromising, so it was decided to alter it to Mickleham Downs.

In spite of nice weather, the attendance was poor. The first item of interest noted, just outside the station at Boxhill, was evidence of the presence of *Bedellia somnulentella*, Zell., on *Convolvulus*. A number of leaves were seen showing the characteristic white blotches caused by the larvae when feeding, but no larvae or pupae could be found in spite of a thorough search. A little later a specimen of *Colias croceus*, Frery. (*edusa*, Fabr.), was observed, but attempts to capture it were futile. Feeding places of the larvae of *Peronea boscana*, Fabr., were next observed on elm near the old Mickleham road, but once again we were too late for the larvae, and the species is apparently uncommon here. The route taken was by the path that turns off to the left at the commencement of Headley Lane and which leads to the top of Mickleham Down. On the way a nice batch of larvae of *Peronea logiana*, Schiff., was found on *Viburnum lantana*, L. (Wayfaring Tree). On the top of the Down, where lunch was had, imagines of *Vanessa urticae*, L., *V. io*, L., *V. atalanta*, L., and *Gonepteryx rhamni*, L., were flying in fair numbers. *Euonymus europaeus*, L. (Spindle) is particularly common in this locality, and signs of the larvae of *Alispa angustella*, Hübn., having fed in the berries were soon found, many of the fruits having small round holes in them. A further search showed that a fair number of larvae were still present in the berries. *Argyresthia semitestacella*, Curt., was beaten out of the beeches, and the larvae of *Leucophthalmia linearia*, Hübn., were observed. The party proceeded along the top of the down for some distance, eventually descending the southern slope to Headley Lane. Seedheads of *Centaurium umbellatum*, Gil. (Red Centaury) collected *en route* produced larvae of the local Coleopteron, *Smicronyx reichii*, Gyll., but no larvae of *Stenoptilia zophodactyla*, Dup., which is usually to be found here.

After tea at the Railway Hotel, some larvae of *Vanessa atalanta*, L., were taken near the station on nettles, together with a larva of *V. c-album*, L. found hanging up for pupation on a nettle stem close by a

well-eaten plant. The latter produced a fine imago on the 18th of September.

Date of previous Field Meeting:—1932.29.v.

4th SEPTEMBER 1938.

FIELD MEETING—WESTERHAM.

Leader: Mr S. N. A. JACOBS.

This well-tried locality was the scene of a Field Meeting on Sunday, 4th September, and was well attended, Coleopterists, Lepidopterists, and Hymenopterists being present.

The woodland around Limpsfield Chart was worked and although, as was general with the season, insects were not abundant, members were able to take away with them some material of interest.

Lunch was taken in the old Beech Avenue, after which members again dispersed in pursuit of their particular wants, meeting again at Pitt's Cottage for tea, to which some twelve members sat down. After a leisurely tea, at which the day's doings were discussed, members dispersed; some to carry on working, others to catch the 7 o'clock train. It can be truly said that a very pleasant day had been spent in the very beautiful woodland of this district.

The following was the only report received:—

COLEOPTERA:—*Dromius linearis*, Ol., *Phyllodecta laticollis*, Suff., *Galerucella sagittariae*, Gyll., and also *Lycoperdina bovistae*, Fb. in a Puff Ball.

Dates of previous Field Meetings:—1930.28.vi; 1931.13.vi; 1933.9.ix; 1934.20.v; 1937.8.v.

10th SEPTEMBER 1938.

FIELD MEETING—ASHTEAD, SURREY.

Leader: R. W. ATTWOOD.

It was originally intended to hold this meeting at Chislehurst but, unfortunately, since the compilation of our programme the area contemplated has been laid out for building purposes. It was consequently decided to transfer the meeting to Ashtead.

This was an afternoon and evening meeting and members were requested to come provided with sugaring apparatus. Nine members attended, of whom eight stayed for evening work. The weather conditions were not good, being cloudy with a cold wind. The only macro-lepidoptera seen in the afternoon were *Vanessa atalanta*, L., *Coenonympha pamphilus*, L., *Heodes (Chrysophanus) phlaeas*, L. and a very worn *Polyommatus (Lycaena) icarus*, Rott. Mr Wakely, however, obtained specimens of the micro-lepidoptera, *Peronea caudana*, Fb., *P. cristana*, Fb. and *Cerostoma radiatella*, Don. The forms of *cristana* were beautifully varied and in lovely condition.

Larvae beating and searching was more productive and the captures included *Dasychira pudibunda*, L., *Cosymbia punctaria*, L., *Biston betularia*, L., *Pheosia (Drymonia) tremula*, Clrck., *Drepana falcataria*, L., *Gastropacha quercifolia*, L., *Homoeosoma binaevella*, Hb., *Myelois cribrella*, Hb. and *Mompha terminella*, Wstw., the last being found in some numbers in the mined leaves of Enchanter's Nightshade (*Circaea lute-tiana*, L.). The very striking white larvae with pink markings of *Homoeosoma binaevella*, Hb. were quite common in the seed heads of a Spear Plume Thistle (*Cnicus lanceolatus*, L.). These larvae feed in the base of the seed heads and a tenanted head could usually be discovered by the ragged and irregular projection of the thistle down. The larvae of *Myelois cribrella*, Hb., were also present in the same plant and could easily be detected by the hole in the calyx through which the frass is extruded.

The Coleopterists reported that sweeping and beating were not very productive and they devoted their attention mainly to the beetles occurring in fungi. The following species were recorded:—*Bolitobius lunulatus*, L., *Pseudotriphyllus suturalis*, Fb., *Triphyllus bicolor*, Fb., *Litargus connexus*, Geoff., *Mycetophagus piceus*, Fb., *Cis bilamellatus*, Wood., *Cryptocephalus pusillus*, Fb., *Lochmaea crataegi*, Forst., *Heledona agricola*, Hbst., *Hallomenus binotatus*, Quens., *Attelabus nitens*, Scop., and *Orchestes avellanae*, Don.

After tea the party decided that the Ride by the enclosed wood was most suitable for sugaring as it was sheltered from the cold wind and yet fairly open. A number of *Noctua (Graphiphora) xanthographa*, Fb., soon appeared and it looked as though it was going to be a good night. Unfortunately the sky, which had been heavily clouded throughout the day, cleared and revealed a nearly full moon, after which very few insects came to the sugar and even those that did so quickly deserted it.

The following insects were taken or noted at the sugar:—*Acrionicta rumicis*, L., *Phlogophora meticulosa*, *Noctua plecta*, L., *N. c-nigrum*, L., *N. xanthographa*, Fb., *Triphaena pronuba*, L., *T. comes*, Hb., *T. fimbria*, L., *Omphaloscelis lunosa*, Haw., *Dysstroma truncata*, Hufn.

The Grasshoppers, *Leptophyes punctatissima*, Bosc. and *Meconema thalassina*, De G. were seen in the afternoon, the latter also visiting the sugar patches.

Dates of previous Field Meetings:—1936.25.viii; 1937.13.vi.

18th SEPTEMBER 1938.

FIELD MEETING—TILGATE FOREST.

Leader: Mr T. R. EAGLES.

The leader is much indebted to Mr F. D. Coote for making preliminary enquiries and the arrangements for tea. Advantage was also taken of a special train provided for the members and associates of the Ramblers' Association. Special accommodation was reserved for the South

London party, which consisted of 15 members and one visitor. Four more visitors—members of the Ramblers' Association—joined the party at Three Bridges.

Rain fell during the whole of the morning and although it cleared in the afternoon conditions were never very pleasant. Nevertheless a good selection of lepidopterous larvae were beaten, among them:—A full fed *Stauropus fagi*, L., from oak; *Notodonta ziczac*, L., *N. dromedarius*, L., *Palimpsestis duplaris*, L., *Anarta myrtili*, L., *Cidaria corylata*, Thnbg., *Boarmia punctinalis*, Scop. (*consortaria*, F.), *Hydriomena coerulata*, Fb. (*impluviata*, Hb.), *Demas coryli*, L., *Bupalus piniaria*, L., *Ectropis* (*Tephrosia*) *crepuscularia*, Hb., and a very beautiful lichen-coloured form of *Biston betularia*, L.

Naturally, very few insects were on the wing but *Rivula sericealis*, Sc., *Cidaria truncata*, Hufn., *Thera variata*, Schiff. and *Peronea cristana*, Fabr. were noticed.

Nothing of especial interest has been reported by the coleopterists. The frog-hopper, *Euacanthus interruptus*, L. and the grasshoppers, *Omocestus viridulus*, L. and *Meconema thalassina*, Fabr. were seen.

The route taken was by the bridle path to the Tilgate Forest, passing Furnace Farm and on to the Cinder Bank Bridge. After crossing the line the party worked among the alders and then went by the path up to the Worth road. A footpath more or less parallel to the road and on the Eastern side was followed. This brought the party out close to the tea rendezvous—the Worth Guest House. Just before leaving the woods a charcoal burner's encampment was noticed. The man in charge said there was a ready sale for the product.

During tea torrential rain fell but happily it cleared for the walk to the station.

Date of previous Field Meeting:—1936.24.v.

15th OCTOBER 1938.

FIELD MEETING—BOOKHAM.

Leader: Mr F. D. COOTE.

This extra meeting was arranged at the request of several members and those who journeyed down by the advertised train worked their way to the ponds, where they were joined by those who had arrived earlier in the day. All the ponds except one were quite dry and the coleopterists, comprising half the party, found enough work there to occupy them until tea-time, while the lepidopterists worked through the woods to Mark Oak Cottage. Tea was taken at 5 p.m. at Mark Oak in order to make an early start with dusking and sugaring. Although the weather was mild the only insects on the wing or at sugar in the evening were *Oporinia dilutata*, Bkn. and *Miselia oxyacanthae*, L., and f. *capucina*, Mill.

On arrival at the railway station members found that they had some spare time and searching the lamp-posts produced *Episema* (*Diloba*) *caeruleocephala*, L., *Hydraecia micacca*, Esp., *Gortyna* (*Ochria*) *ochracea*, Hübn., *Orrhoedia* (*Conistra*) *ligula*, Esp. and *Colotois pennaria*, L.

Larva-beating during the afternoon was very unproductive, as also the rather desultory efforts at pupa digging.

Those present enjoyed the meeting and as the weather was so good they were surprised that the entire party only numbered four.

The following species of Coleoptera were reported:—*Stenus cicineoides*, Gr., *Coccidula rufa*, Klug., *Atomaria mesomelas*, Hbst., *Heterocerus fenestratus*, Thun., *Chrysomela polita*, L., *Psylliodes affinis*, Pk., *Apion miniatum*, Germ., *Ceuthorhynchus melanostictus*, Marsh., *Ceuthorhynchus asperifoliarum*, Gyll.

Dates of previous Field Meetings:—1932.13.v; 1934.9.vi; 1935.6.vii; 1937.17.iv.

30th OCTOBER 1938.

FIELD MEETING—HOLMSLEY, NEW FOREST.

Leader: Mr F. D. COOTE.

It has not been the custom of the Society to organise a Field Meeting so late in the year, but as the Ramblers' Association was running an excursion to the New Forest on the above date, it was decided to take the opportunity of a cheap trip and to pay a second visit to the New Forest via Holmsley. Eight members and two visitors journeyed by the train, accommodation having been reserved for the party, arriving in the Forest shortly after midday. At Holmsley Station we were met by Messrs S. Brown, P. Harwood (both of Bournemouth) and Mr P. Nagle (of Picket's Post, near Ringwood). Mr Harwood took three of the Coleopterists of our party in his car to Mark Ash and they on their return at tea-time, reported having had a good bag. Mr Brown and Mr S. Wakely worked near the station. They obtained several larvae of *Dioryctria abietella*, Fabr. in cones of *Pinus sylvestris*. A quantity of fresh cones were collected from which it is hoped to breed *Enarmonia conicolana*, Heylaerts, in due course, most of last year's cones on the trees showing holes made by moths that emerged last June. They also found larvae of *Tischeria complanella*, Hübn., locally common on oak, making large white blotches on the leaves. Several species of *Nepticulidae* were also taken.

Meanwhile Mr Nagle took the rest of the party to the Holmsley enclosure, as being the best part to work near the station. He was unable to stay, but promised to rejoin us after tea. The drizzling rain, which had been falling during most of our journey from London, had ceased on our arrival and the tracks through Holmsley Enclosure were comparatively dry. The foliage, however, was too wet to attempt beating for larvae. Some of the members tried pupa digging, but without any

success. A few *Asthena dilutata*, Bkn., were disturbed, also a few micros, including a rather unusual form of *Peronea fissurana*, Pierce.

Tea was taken at the café adjoining the railway station at 5 p.m., and shortly afterwards Mr Nagle joined us with Mr Watson, one of our members who recently left Kent to reside at Ringwood. They took two of our members by car to a drive in the Holmsley enclosure where they had sugared a number of posts. Crowds of insects were found on the treacle, but often there were more on the posts sugared a week previously. The specimens were nearly all *Conistra vaccinii*, L., and *Orthosia satellitia*, L., accompanied by a few *Orthosia lota*, Clerck and *Miselia oxyacanthae*, L. There were no signs, however, of *Polia ornithopus*, Rott., *P. socia*, Rott., *P. semibrunnea*, Haw. or *Aporophyla aprilina*, Haw., which had been taken during the previous week at the same place.

Mr Burton sacrificed some of the apples he had brought with his lunch and, cutting them up into rings, hung them up on some trees near the railway station just before tea. Visiting them afterwards, they were found to have proved very attractive, as many as seven insects being on a single ring. However, only the common moths, mentioned above, were taken.

The return train left Holmsley at 7.20 p.m. and the party had a comfortable and rapid journey to London. Considerable amusement was caused by a number of "hikers" visiting our compartment in the train to find out what "bug hunters" did in the winter time. They appeared to realise that entomologists are not quite the type occasionally portrayed by the comic papers.

Mr F. D. Buck reported the following species among other Coleoptera:—*Carabus violaceus*, L., *C. arvensis*, Hb., *Paederus caligatus*, Er., *Chaetarthria seminulum*, Hb., *Pterostichus niger*, Sl., *Stenus kiesenwetteri*, Rh., *Rhizophagus ferrugineus*, Pk., *Psammoeccus bipunctatus*, F.

Date of previous Field Meeting:—1936, 28.vi.

26th NOVEMBER 1938.

VISIT TO THE BRITISH MUSEUM (Natural History), South Kensington.

Leader: Mr F. D. COOTE.

The Council decided this year as an experiment to arrange during the winter months for some visits to places of interest that would especially appeal to Naturalists, and the first on the programme was fixed for the Natural History Museum, South Kensington. Capt. N. D. Riley and Dr K. G. Blair very kindly undertook to lead the party, consisting of nearly 30 members and their friends.

Starting at 2.30 p.m. they were conducted to the students' section of the galleries and shown some of the treasures not usually exhibited, including some very valuable books, etc., such as Hübner's original

works and the originals of the illustrations for Frohawk's "British Butterflies." Petiver's collection was also exhibited and proved most interesting. The cabinets of British Lepidoptera were opened for inspection. Some of the wonderful examples of Mimicry and Seasonal Dimorphism were exhibited and explained by Capt. Riley. Meanwhile Dr Blair had taken those interested in orders "other than Lepidoptera" to another part of the building, where some very interesting Coleoptera were exhibited and described. These included luminous Coleoptera, forms characteristic of desert regions, the dimorphic males of certain *Lucanidae*, etc.

Capt. Riley and Dr Blair were very heartily thanked for their kindness and at 4.15 p.m. members dispersed. Some members remained in the building to view the exhibits in the public galleries while about half of the party adjourned to Lyons depot for tea. Everyone seemed to have had a most enjoyable time and were of the opinion that the experiment had been very successful.

ANNUAL ADDRESS TO THE MEMBERS OF THE South London Entomological and Natural History Society.

Read 26th January 1939.

By F. STANLEY-SMITH, F.R.E.S., President.

AS no doubt you already appreciate for yourselves, and as you have been assured by the reports of the Treasurer and Council which you have just heard, the affairs of the Society continue to be in a satisfactory condition. We are told that we need new members. I suggest the position is that all workers in any branch of Natural History need the help and good fellowship which a society such as ours offers. Remember, too, our interests are not restricted to Entomology. Especially, it appears to me, do we need strengthening on the botanical side.

Knowledge that it will be necessary to move our quarters ere long has caused your Council some little anxiety which it is hoped will be allayed early in the year now opening. It was the fore-knowledge of this pending change that, to my great regret, has held up any attempt during the past year to make certain alterations in our arrangements. Whether in our new quarters there will be any necessity for improving the lighting, or for the appointment of stewards to arrange the benches and ensure the proper circulation of the exhibits at our indoor meetings, remains to be seen.

The one important change which has been made, namely the appointment for the year of Assistant Secretaries as organisers of our meetings, has, I trust you will agree, been an outstanding success, and I take this opportunity personally to thank Messrs Syms and Coote for the way they have fulfilled their prescribed functions and provided something of interest for each of our meetings, thereby obviating the gaps which sometimes occurred in the past, and so smoothing the path of the Chairman. I hope that the new Council will see their way to continue such appointments.

I should like here also to break down the anonymity in the Council's report as to the workers on our collection of lantern slides, so that the individuals Messrs Coote and Tunstall, who have given of their leisure to this task, may receive appropriate recognition. [Applause].

The Council's report shows the present membership at 260. Comparison with the past may be of interest. The Society was founded in 1872. Its membership in the early years was presumably small. In each of the

three years from 1886 to 1888 its membership increased by 50 a year and reached 200. There was a further increase to 232 by the end of 1890, followed by a gradual fall to a minimum of 166 at the end of 1899. The figure then remained about constant till 1914. During the war it ran down surprisingly little, and from 1919 it steadily rose to reach the present figure of 260 at the end of 1927 and at the end of 1928, 10 years ago, touched maximum at 265. There followed a drop to 245 in 1934, since when membership has slowly but steadily increased again.

It is with deep regret that I have to-night to announce the death of our oldest member, which took place somewhat unexpectedly on the morning of our last ordinary meeting. That well-known entomologist, Commander J. J. Walker, M.A., R.N., F.R.E.S., F.L.S., passed away on 12th January 1939, at the ripe age of 87. In his early days, when serving in Chinese and Australian waters, he made valuable collections which were later presented to the Natural History Museum by the Lords of the Admiralty, while his extensive collections from the Mediterranean countries later also enriched the national collections. His British collections were made mostly in and around the Isle of Sheppey till 1904 and afterwards in the environment of his new home at Oxford, and for many years in the New Forest. This collection has been left to the Hope Department, Oxford.

His published papers include "Entomological Collecting during a voyage to the Pacific" and "Antipodean Field Notes" in the "Ent. Mo. Mag." in 1881-3 and 1902-6 respectively; the "Natural History of the Oxford District," prepared for the British Association's meeting in that city in 1926, and the "Annotated List of the Coleoptera of the Isle of Sheppey," published in the "Transactions of the Entomological Society of the South of England" (1932). His first paper in the "Ent. Mo. Mag." appeared in 1872, and the last in the current month. Since 1927 he has been the editor of that publication.

He joined our Society in 1880 and remained a member to the time of his death, a period of 59 years. He does not appear to have held office at any time. He was elected a Fellow of the Entomological Society of London in 1878, served as President, Vice-President, Secretary, and on its Council, and was elected a Special Life Fellow in 1933. He was also a Fellow of the Linnean Society.

I regret also to have to announce the death of Dr Gahan on Saturday last. C. J. Gahan, M.A., D.Sc., was a member of our Society from 1911 to 1933. He was the first Keeper of the Department of Entomology in the British Museum, and a past President of the Royal Entomological Society of London. He wrote an important paper on "Mimicry in Coleoptera" for our "Transactions" in 1913, but his best-known work is his volume on the *Cerambycidae* in the "Fauna of British India" series. He had been very ill for some months and died on the 21st January, 1939.

It is my sad duty also to make reference to other members lost by death since our last annual meeting.

By the death of Stanley Edwards we finally lost one of the great workers by whom our Society has been developed to its present state. Joining in 1886, in January 1894 he became Hon. Corresponding Secretary, which office he held continuously till compelled to relinquish it owing to failing health at the end of 1931, a period of 38 years. He was then elected an honorary member in recognition of his long, earnest and successful connection with the Society. He filled the office of President in 1918 and 1919. After his resignation we saw but little of him.

He was elected to the Entomological Society of London in 1884, served on its Council from 1912 to 1914, and remained a Fellow till his death. He was also a Fellow and active member of the Linnean and Zoological Societies, a member of the Ray Society and Honorary Secretary for many years of the West Kent Scientific Society.

Born at Kidbrooke Lodge, Blackheath, on 24th May, 1864, and educated privately, early in life he was attracted to natural history by the insect fauna of his garden and the surrounding country, not yet covered by bricks and mortar and smothered by London smoke. His early collecting was largely done in his own neighbourhood and he put together a fairly representative collection of British Lepidoptera. Later his interests extended to Continental and Exotic insects, and branched out to embrace Coleoptera, Orthoptera, and Hemiptera. Although he only made one or two collecting trips abroad, in the company of the late Dr Chapman, F.R.S., and J. W. Tutt, by means of foreign correspondents he amassed an extensive collection of Exotic Lepidoptera, and many of the larger, rarer, or more conspicuous species of the other orders mentioned. In the Zoological Society his main interest lay with the Reptilia. He was a regular attendant at our field meetings in the old days, and organised many of them. After the death of his father his resources became much more restricted, and he gradually parted with both his library and his collections. He was never married.

While his circumstances permitted he was most generous to those who asked for aid. He will long be remembered by all who knew him for his geniality and urbanity. New members in particular had reason to be grateful to him for his kindly hospitality. So long as he was able, his zeal for the best interests of the Society was unbounded.

He died at Harrogate on 21st March, 1938, in his 74th year.

Baron A. J. Bouck, F.R.E.S., joined the Society in 1923. Since coming to this country he had got together a large collection of British Lepidoptera. He died on 11th February 1938.

Palmer Brodie, B.A., was interested in Micro-lepidoptera. He joined the Society in 1934, and was killed in a motoring accident in October, 1938.

W. S. Gilles, F.I.C., F.C.S., a keen worker on the Lepidoptera, joined our Society in 1928, having become a Fellow of the Entomological Society of London three years earlier. He occasionally attended our meetings and contributed notes to "The Entomologist." He was an ardent supporter of nature reserves. He died on 2nd December last year.

In addition must be mentioned the deaths of four well-known entomologists who were not, however, members of our Society. Dr Seitz was primarily responsible for the famous work on the Lepidoptera of the world which bears his name. Edward Meyrick, F.R.S., was an authority of world-wide repute on the Micro-lepidoptera. His "Hand-book" is indispensable to all workers in that sub-order. Major E. E. Austen, D.S.O., followed the late Dr Gahan as Keeper of the Department of Entomology at the British Museum, and C. F. M. Swynnerton was Director of the Tsetse Research Department, Tanganyika Territory; both these latter names are for ever linked with the study of *Glossina austeni* and *G. swynnertonii*. It is fortunate for the world that Swynnerton's monumental work on the Tsetse flies was completed before his untimely death.

I ask you to stand for a minute in respectful recollection of our fellow workers.

Among the noteworthy events in British entomology of the past year, two captures at our field meetings are deserving of special mention—*Laphria gilva*, L. (Dipt. Asilidae), a species new to Britain taken at Ascot by Mrs Blair, and *Helcon ruspator*, L. (Hym. Braconidae), the second British record, taken at Forest Row by Dr Blair.

These were individual successes, but I have long felt that one aim of a society like ours should be to get results by concerted work. For example, much might be done to help in the elucidation of the genetics of certain of our moths if groups of members were to share and breed the progeny of known pairings, pooling the results. By this means, whole broods might be reared without overtaxing the resources of individual members.

Granted that, for most of us, interest in our particular branch or branches of natural history is merely a hobby, yet as a society we claim to be scientific, so we should take steps to sustain that claim. There is danger with some of us that our collecting may descend to, or may never rise above, mere acquisitiveness—that filling a cabinet with numbers of every obtainable species may be thought an end in itself. To help combat that danger, I propose to speak to-night on a few of the historical instances of the benefit to mankind of a knowledge of insects. I am of course aware that the subject is no new one, yet the choice of a theme of general interest is limited, and I have hoped that, by approaching it quite independently of anything that has been done before, I shall succeed in sustaining your interest for a short time.

HISTORICAL INSTANCES OF THE BENEFIT TO MANKIND OF A KNOWLEDGE OF INSECTS.

I propose to describe briefly a few instances in which a knowledge or investigation of insects has produced results which, even in the judgment of the man in the street, have been beneficent.

A striking example of this kind occurred in the construction of the Panama Canal. The story started at two widely separated points. The first was the discovery of America by Christopher Columbus in 1492 while he was seeking to sail westward from Europe to Cathay. Almost as soon as it was realised that the passage was obstructed, i.e. in 1550, the idea was mooted of cutting a canal through the Central American isthmus to permit the passage of ships further westward. From that time onwards various schemes were worked out on paper without anything practical being done, and it was not till the completion of the Suez Canal in 1869 that attention was focussed on the American problem. A French association then sent an expedition under Lt. L. N. B. Wyse to examine the Panama line, and in May, 1878, Wyse obtained a concession from the Colombian Government. A French company under the presidency of Ferdinand de Lesseps, purchased the concession for 10,000,000 francs. Its plans were to cut a canal at sea-level from Colon on the Atlantic to Panama on the Pacific, entailing the excavation of 157,000,000 cubic yards of earth and rock, which work was expected to be completed in eight years. While the administration of the company left much to be desired, yet the prime cause of the failure of this effort was the prevalence of tropical fevers. The labourers employed numbered from 15,000 to 18,000. The death rate in 1884 was over 60 per 1,000, almost entirely from yellow fever and malaria; in 1885 it exceeded 70 per 1,000. It was impossible to recruit men for this deadly job, and there was a general panic among the workers. Slow progress was made till 1887, when the plan was changed to one with locks, involving less cutting. This went on till 1889, when the company failed. A new scheme was devised, and another French company obtained successive extensions of the Wyse concession, the final expiry date being in 1910. This company continued the work from 1894, still under the severe handicap of disease, till 1899, when it also gave up work. Meanwhile, the United States, with the growth in political importance of its Pacific sea-board, began to appreciate the importance of a canal, and decided in favour of a Nicaraguan route. The French company thereupon, in 1902, sold its Panama rights and works to the United States government for 40,000,000 francs. In 1903 that government secured from the new Panama Republic control of a strip 10 miles wide on the line of the works.

The second starting point was with Dr Patrick Manson, who, in 1875, suggested that yellow fever was conveyed from man to man by an outside living agency. This hypothesis was maintained about 1881 by Dr Finlay in Cuba, who believed transmission to be by a particular type of carrier. This theory was subsequently verified by a Board of United States army surgeons, the female of the mosquito known as *Aedes (Stegomyia) aegypti*, L. being convicted as the vector. It was found that this insect must feed on the blood of a human sick with the fever, within the first 3 days of the disease. After an interval of 12 days or

more the insect in biting transmits the germs to another human, who, if not immunised, may develop the disease.

In 1880 a French doctor named Lavarán discovered the parasitic nature of malaria. Further advance was slow till 1894, when Dr Patrick Manson, working in China, conceived the theory that the malarial germ carried on its existence by passing from one body to another, that in both hosts it went through a definite phase of development, and that the parasite escaped from the human body through the medium of a blood-sucking insect. Since mosquitoes abounded in malarial districts, he reasoned that this insect was to be considered under suspicion.

It was left to another doctor, Major (since Sir) Ronald Ross, to work out this theory, and in 1898 he proved to the medical world not only that the mosquito sucked malaria parasites from human blood but that the parasites underwent a cycle of development in the body of the mosquito which, given a favourable opportunity, injected them back into the human blood stream. He also discovered it to be a fact that only the Anopheline mosquitoes, and only the females of the species, would do this.

The breeding habits of the yellow fever vector, *Aedes aegypti*, were worked out in Havana in 1901 by Col. Gorgas during his campaign to exterminate the disease there. He found it to be a home-loving little creature, breeding and remaining in or near human habitations, in stagnant water in containers, rather than in pools or puddles. The habits of the Anopheline malaria carriers were then less well known.

The time was now ripe for the two stories to draw together.

President Roosevelt appreciated that the difficulty of constructing the canal arose just as much, if not more, from the fever as from the engineering side. Accordingly he sought the best possible man for the post of Chief Sanitary Officer, and appointed Col. Gorgas, fresh from his triumph in Havana, to the post. This officer commenced work in 1904 and energetically tackled the task of suppressing the mosquitoes, and with them the yellow fever and malaria. To combat *Aedes aegypti* it was made a penal offence to have water about one's premises permitting "wrigglers" (mosquito larvae) to breed. This was the more difficult to stop as there was no piped water supply, all being obtained from peddlers and stored in numerous household vessels. These containers were ordered to be made mosquito proof. A fumigating process was regularly carried out in all houses and buildings. To deal with *Anopheles* (three vector species were found—*albimanus*, Wied., *tarsimaculata*, Goeldi and *pseudopunctipennis*, Theob.) all small water channels were concreted and redesigned so that the water should flow quickly. Swampy places were drained, and all breeding places within 200 yards of habitations and works that could not be done away with were regularly sprayed with oil. On the human side all suspected fever cases were screened off so that no mosquitoes could get their blood and with it the germs. When the American employees arrived in 1905 they were housed in one large building in which the water containers were

searched regularly for " wigglers " and the rooms were fumigated every fortnight. The building should have been fitted with proper mosquito screens, but this was not done before the architect who should have done the work caught yellow fever, and died from it. After that it was speedily done. The men were supplied with quinine daily.

As the position improved the movements of every yellow fever patient were traced in order, if possible, to destroy by fumigation not only the mosquitoes that might have drawn infection from him during the first three days of his illness but also those that might have conveyed the original infection to him. The last yellow fever case of local origin took place in 1906. Malaria was not completely stamped out, but by the end of 1907 the death rate was down to 18 per 1000 per annum.

\$20,000,000 were voted for this work of sanitation, which was carried on for 3 years. It was considered the most necessary expenditure of all as without it the fevers would have greatly retarded the work or prevented it altogether. The canal was eventually completed and opened in 1920.

Few of the results springing from a proper understanding of insects have been so striking as this last, but their importance in medical work, particularly in connection with tropical diseases, now receives general recognition. Mosquitoes are now known to be the transmitters not only of yellow fever and malaria, but of filariasis, leading to elephantiasis, and of Dengue or breakbone fever. The tsetse conveys sleeping sickness in humans and nagana among cattle; fleas convey plague and lice typhus.

A striking commentary on the growing realisation of the danger from insects is to be found in the research conducted in 1938 by Imperial Airways to devise an apparatus and to prepare a gas for use in the enclosed cabins of aeroplanes to destroy noxious insects. The countries through which the company operates all have regulations to prevent the carriage of disease-bearing insects by 'plane. In October the company demonstrated an atomiser worked from the engine which vaporised a liquid distilled from pyrethrum, harmless to humans, but lethal to mosquitoes, tsetse flies, and most insects. As soon as the method receives international approval, it is intended to fit all the company's machines with the apparatus.

The story of yellow fever has been but half indicated in connection with the canal. It is believed to have originated in Africa, and with improving communications to have been conveyed thence to the New World and to have spread to Asia. Following its conquest in Panama the campaign for its suppression was continued throughout the New World, until it was thought to be exterminated there. In 1924, however, there was a fresh outbreak in the City of San Salvador, which, due to indifference of the populace, was difficult to subdue. The next year there were outbreaks in Brazil and Colombia. In Africa the difficulties due to the less advanced development of the country are much greater, and it will be a long time before it is stamped out.

Malaria also has been successfully attacked in various parts of the world. Many of you will be familiar with the war-time efforts to prevent this and other diseases, in particular with the spraying that was carried out in Palestine and elsewhere. But so far, in spite of all efforts, taking the world as a whole, it is still reckoned to be the most important disease.

Tsetse flies are being effectively controlled by traps of various types, described in Swynnerton's work mentioned earlier. A striking success of the Harris trap was reported from Cape Town in November. In one district in Zululand in 1931, 51 traps captured 216,960 tsetses in one month. In 1938, in the same time and district, 1,081 traps caught only 3 tsetses, and nagana had almost disappeared.

Turning now from the effect of insects on human health, to which they seem to be entirely harmful, another aspect of the problem is the effect on our crops. Ever since man began to raise crops the problem of protecting them from insects has occupied an appreciable portion of his time. In recent times much research has been done by our Ministry of Agriculture, and advice has been issued on many problems, with some of which everyone must be familiar. In the United States similar work is done on a much greater scale. The Pyrale, *Pyrausta nubilalis*, Hb., with us is accorded an article in "The Entomologist," when consequent upon our last Benfleet meeting a few specimens from a single brood are captured. In the States it is regarded as a serious pest under the name of the "European Corn Borer." Introduced there from Italy or Hungary about 1908 or 1909, it was first noticed as a pest in 1917. As the larvae there feed on growing maize they are proving difficult of control, the only measures so far helpful being the destruction of crop residues and plant refuse in the Autumn and early Spring, and late planting so that the larvae do not reach their most voracious stage before harvest. As wheat and barley do not seem to attract the insect, which at Benfleet appeared to be feeding on mugwort, there seems no danger of its becoming a pest in this country.

A famous example of the use of insects to control plants comes from Australia. It seems strange how much that great country has suffered from introduced pests. Its rabbits have become the classic example, but we are told by Tillyard that there were no aphids there till introduced by man, whereas now there are a number of harmful species. The particular example I have in mind, however, is the control of the Prickly Pear. In this case the plant was not a food, but a pest, so the work of the insect was beneficial.

The plants belong to the *Cactaceae*, a family of plants originally confined to America. One species, probably *Opuntia monacantha*, Haw. was first introduced to Australia in 1788, and a single specimen of *Opuntia inermis*, P.DC., was taken to Scone, New South Wales, in 1839. About 20 other species were introduced at various times, but it was from that one plant of *O. inermis* that the greatest known plant invasion is supposed to have sprung. From Scone plants and cuttings were transported to the pastoral areas, where they were grown as hedges.

About 1870 it was realised that the plant had got beyond control. By 1893 thousands of pounds had been spent on its control in New South Wales, and in 1895 it was added to the list of noxious weeds in Queensland. By 1900 it covered 10,000,000 acres. Following the great drought of 1902 it increased so rapidly that by 1920 it covered 60,000,000 acres and was gaining at the rate of 1,000,000 acres a year. It reached its maximum about 1925, since when the control measures adopted began to tell against it.

First attempts at control were by mechanical means, and had but a limited application, being costly. Later, poisoning by injection or sprays was tried but this also, though cheaper, was too expensive. Biological control was then tried, the intention being to use various insects to attack all parts and conditions of the plant. Insects introduced included the Phycitid moth, *Cactoblastis cactorum*, Berg.; the cochineal mealy bugs, *Dactylopius opuntiae* (*tomentosus*), Ckll., *D. ceylonicus* (*indicus*), Green., *D. confusus*, Ckll., *D. newsteadi*, Ckll., and *D. coccus*, Costa; the red mite *Tetranychus opuntiae*, Banks; the bug, *Chelinidea tabulata*, Burm., and the beetle grub, *Moneilema ulkei*, Horn. The moth, however, proved so successful in some areas that there was no need for other insects to assist it.

Cactoblastis cactorum, a native of Uruguay and Argentina, with its gregarious tunnelling larvae, was introduced in 1925, the one and only shipment consisting of 2,750 ova. The larvae thrived on *O. inermis* and *O. stricta*, Haw. in the Sherwood laboratories throughout the Winter, and in September produced moths that laid 100,000 eggs. The second generation within the 12 months produced over 2½ million eggs. Of these, 2¼ million were liberated at 20 selected localities, and from other broods in captivity a further 6¼ million were liberated in 1926 and 1927; by which time it was clear that laboratory rearing of the larvae was unnecessary. Material was collected in the field, the emerging moths laid in cages, and from 1927 to 1929 300 million eggs were distributed.

The larvae live in colonies of from 20 to 100, eating out the interior of the *Opuntia* stems and penetrating even the underground tubers and roots of the plant. With the aid of wet rots caused by fungi and bacteria, the plant may be killed entirely. The moths, although free-flying, mostly oviposit close to their point of emergence, setting up a high density in a restricted area, so that, assisted by wet rot, the pear collapses and dies from a central point outwards.

By 1933 most of the "Prickly Pear" had been destroyed in large areas in Queensland and the northern areas of New South Wales, and thousands of acres were being brought into cultivation. This spectacular destruction, however, did not necessarily mean the complete annihilation of the pest everywhere. For a few months one would see nothing but dead-looking pear, but with the arrival of the growing season from September to December the living tubers and roots would throw out fresh growth. *Cactoblastis* having seriously diminished, due to the disappearance of its food plant, it was found to take a year or two for

the insect to gain ground again and accomplish the destruction of the new growth.

Before the moth got to work, cochineal insects had proved very effective. These mealy bugs of the family *Coccidae*, *Dactylopius* species, all feed on Prickly Pear and other cactus plants, each species being highly selective. A strain of *Dactylopius opuntiae*, Ckll., from Texas was remarkably destructive of *Opuntia stricta* in Central Queensland in the dry years 1925 and 1926. Moreover, where the pear had been damaged by *Cactoblastis* or other insects, any *Dactylopius* present gave the plants little chance of re-establishing.

Three species of plant-sucking cactus bugs of the genus *Chelinidea* were introduced, but only *C. tabulata* flourished. Eight consignments were introduced from Central America during 1921 to 1923. Double-brooded, the bugs feed by inserting the proboscis and sucking the juice from the stems. The insect prefers the more succulent parts, so the young growth that occurs after *Cactoblastis* is freely attacked. It multiplied so enormously that by 1930 hundreds of acres of dense prickly pear were yellow from its work. While it rarely killed the plants outright, it helped considerably by reducing their vitality. Since the destruction by *Cactoblastis*, however, the *Chelinidea* have become scarce.

A red mite, *Tetranychus opuntiae*, Banks, from Texas was accidentally liberated and for a time spread very rapidly. It chose for attack only really succulent pear. Plants severely attacked do not recover their vitality even after 2 years. It had some initial success, but is no longer an effective controlling agent.

The beetle *Moneilema ulkei*, Horn, was introduced, but was of only slight help.

Moths of the genus *Minorista* were being tried in the hope that the larvae might help in controlling the regrowth.

Following the Australian success, the cochineal insects, *Dactylopius ceylonicus* and *D. opuntiae* rapidly reduced the prickly pear to relative unimportance in South India and Ceylon. In Mauritius the reduction of *Opuntia tuna*, Mill, was showing considerable promise. In Madagascar the accidental introduction of *D. coccus* has eradicated *O. dillenii*, P.DC., over a large area. Early this month the report of the Division of Plant Industry, Pretoria, revealed that in several parts of South Africa the Union's greatest plant pest, the prickly pear, was collapsing before the onslaught of *Cactoblastis cactorum*. The moth was introduced from Australia. There are now 460 insect colonies in the field. Even scattered plants in between the colonies are being attacked.

This, then, has been to my mind the most spectacular example of biological control; it was a case of control of plant by insect. A similar attempted control was mentioned at one of our meetings earlier this year and comes from New Zealand. In that country the Ragwort plant, *Senecio jacobaea*, L., was introduced from Europe. When eaten by horses or cattle it causes cirrhosis of the liver, ending in death, and no

remedy is known. It was considered that the cinnabar moth, *Tyria jacobaeae*, L., which frequently devastates ragwort over large areas in England, offered the best chance of controlling the plant. Half-a-million larvae were ordered from England, and actually 320,000 were sent out as pupae, sealed to exclude parasites, in 1927. The insect maintained its hold in one area only, and proved a failure. A fly, *Pegohylemia seneciella*, Meade, showed some promise and was to be tried instead.

But the first successful and classic example of control by insects was of insects themselves. The Fluted Scale or Cottony Cushion Scale, *Icerya purchasi*, Mask., which you will remember was exhibited this year by Dr Blair for Mr Wallis Norton on mimosa from Stratford-on-Avon, was unwittingly introduced into California about 1868 and soon became a most serious pest of the orange. By 1890 it had spread over the whole state, killed hundreds of thousands of trees, and was threatening to wipe out the whole of the citrus industry. Investigation showed that the scale insect must have come either from Australia, where little damage resulted from it, or New Zealand, where it was very destructive. Accordingly the U.S.A. government sent an entomologist to Australia to search for natural enemies. He selected the lady-bird, *Rodolia cardinalis*, Muls., and some 500 were shipped to California, where they were liberated on screened orange trees. Within eighteen months the beetles had increased to such numbers that they had checked the scale insect over the whole state. They have since nearly eliminated it entirely. The same species of lady-bird has since been taken to New Zealand, Egypt, Hawaii, Italy, Syria and Cape Colony, as the scale insect appeared in those countries, and everywhere it has met with success.

This led to many other applications of the principle. The establishment of the Chalcid, *Prospaltella berleseii*, How., to combat the mulberry scale, *Diaspis pentagona*, Targ., in Italy has been credited with saving the silk industry in that country. The repression of the coconut moth, *Levuana viridescens* (Lep. Zygaenidae) in Fiji by a parasite new to it, the Tachinid *Ptychomia remota*, from Malay, is another now well-known example.

For the latest method of insect control the aeroplane has been pressed into service, so this perhaps can be counted as an offset to its dangers as a carrier of noxious insects. In the United States commercial concerns now provide specially designed machines to fly slowly and low, for spreading poison dust (arsenate of lead, etc.) over growing crops. They can cover the ground much more quickly than any sprayer worked from *terra firma*, dusting belts of from 200 to 500 acres per hour. They have already been used successfully against the Catalpa sphinx, *Ceratonia catalpae*, Boisduval, the Gypsy moth, *Porthetria dispar*, L., the sugar-cane borer, *Rhabdoenemis obscurus*, in dusting peaches and in destroying mosquitoes in impenetrable swamps. The powder discharged from built-in hoppers is evenly spread by the slip-stream. An interesting discovery is that the dust particles get electrically

charged on leaving the machine, so that they cling to or are repelled by the leaves of the plant according to how the leaves are charged. Investigation is proceeding to see whether this factor can be turned to use.

Lastly, I propose to turn from accomplished results to a problem yet to be finally solved—the conquest of locusts. In 1491 B.C., when the Israelites were being persecuted by the rulers of the land, a devastating plague of locusts fell upon the country. To-day conditions are much the same, and these insects are still the dread of many countries in which the swarms occur. Enormous damage has been done to the corn and other crops of North America; in South America many a pioneer planter has been ruined by them; in the northern Mediterranean countries, if they do break out less frequently, they are still dreaded owing to the value of the crops; in Russia, Siberia, and Northern Africa, where the crops are valuable but where uncultivated areas afford suitable breeding grounds, they are still a constant danger; in South Africa alone, up to 1928, half-a-million sterling was spent annually in attempts to suppress the insect; while in Australia, with the spread of cultivation, the problem is becoming of importance.

Uvarov divides the *Acrididae* into two groups—the typical locusts, characterised by the inclination of their “hoppers” to live in bands and act in concert, and the tendency of the adults to make direct flights in swarms; and the grasshoppers, the solitary species, the individuals of which behave independently.

In 1921 he advanced as a working hypothesis his *Phase Theory*, which, quite simply, is that various species of *Acrididae* are unstable both morphologically and biologically, and within limits are liable to fluctuations in all essential characters, so much so that the extreme forms represent the two *phases* of the species, one being a typical swarming locust, the other an equally typical solitary grasshopper.

He arrived at this theory by studying the relationship between two “species,” the locust, *Locusta migratoria*, L., and the grasshopper, *L. danica*, L., in the Northern Caucasus. In 1912 in the Stavropol province enormous swarms of typical *migratoria* appeared; large numbers were collected and studied, and no *danica* were observed. In the following spring the offspring included hoppers with the coloration of *danica*, the adults varied in the direction of and included numbers of that species, the swarms were much less dense, and *danica* were found scattered all over the area. Similar but less striking observations were made elsewhere in the two subsequent years. These observations permitted only one conclusion—that *migratoria* and *danica* were but temporary forms of one species, and that Uvarov had witnessed the mass transformation of one form into the other.

Other observations linked up the Brown locust, *Locustana pardalina*, Clk., with its solitary phase, *solitaria*, Uvarov; and the Desert locust, *Schistocerca gregaria*, Forsk., with its solitary phase, *flaviventris*, Burm. In the latter case Uvarov first suggested the relationship from his theory.

The South American locust, *Schistocerca paranensis*, Burm., is proved to link with the solitary phase, *S. americana*, F. Of the African Red locust, *Nomadacris septemfasciata*, F., there are two forms which Uvarov suggests represent the two phases. These five comprise practically all the larger true locusts of the world. Of the smaller ones the Moroccan locust, *Dociostaurus maroccanus*, Thnb., looks likely to find its solitary phase in the pigmy race found in Montenegro called *degeneratus*, Baranov. In America the Rocky Mountain locust, *Melanoplus spretus*, Walsh, has practically disappeared, but Uvarov suspects that the "degenerate" *M. atlantis*, Riley, represents the solitary phase.

Plotnikov, in the laboratory, proved that the coloration of hoppers depended on the condition under which they were kept, so that an individual could change its colour if the conditions were altered. The chief condition in question was the density of the population in the cage, overcrowding producing the coloration typical of *migratoria*, no matter whether originally that form or *danica*. The changes occurred after one or more moults under the altered condition.

Prof. Faure, by his series of laboratory experiments in South Africa over the years 1928 to 1932, finally put the Phase theory beyond any doubt. He uses the terms "gregaria" and "solitaria" to indicate the gregarious and solitary phases, with "transiens" for the intermediate forms. Working with *Locustana pardalina*, Walker, in one series he crowded the progeny of wild hoppers of the solitary phase into cages. In the F_1 generation, of the first instar hoppers 95% were the colour of "solitaria;" in the fourth and fifth instar 42.9% had become "gregaria" in colouring. In the F_2 generation again only about 5% of the first instar hoppers were "gregaria" colour—a possible explanation being that the F_1 adults were isolated for ovipositing, but the fourth and fifth instar hoppers were over 99% "gregaria" in colouring. In F_3 first instar hoppers were over 90% "gregaria" in colouring, and fourth and fifth instar again over 99%.

A second series was started from adults of the solitary phase collected in the field, and a third with "solitaria" hoppers collected and crowded. In every cage except one a proportion of "gregaria" coloured hoppers was produced before the adult stage was reached.

He also applied biometrical measurements and ratios to the progeny in his experiments, and by this criterion also showed that "gregaria" were produced by overcrowding.

The effect of overcrowding in cages was to produce great jumping activity.

He was unable from lack of material to reverse the experiment from wild "gregaria," but by isolating (one to a cage) 1st instar bred "gregaria" hoppers he produced 100% coloured like "solitaria" not later than the 5th instar.

He obtained corresponding, if less complete, results with the Red Locust and the tropical form of the Migratory Locust. Altogether his results were so convincing that the specific identity of the two phases

could not be doubted, and he was convinced that, in the wild, swarms of "gregaria" arise from "solitaria" parents without admission of any "gregaria" material.

The Phase theory completely revolutionised ideas regarding locusts, and since its discovery progress towards the solution of the problem has been more rapid. In South Africa, whereas before 1926 the locust officers took very little notice of the solitary phase, their destruction of incipient swarms forming from "solitaria" between 1929 and 1931 finally convinced them of their importance. They have roughly delimited the permanent habitat of *L. pardalina* and have circumscribed three areas of incipient swarming, which demand constant vigilance. Further north mobilisation points for other African swarms have been located, one near the Red Sea, and another near the Niger river. In August 1938 an International Locust Conference, attended by 20 countries, was held at Brussels, and plans were formed to deal with the Migratory locust breeding in French territory. The Conference, however, failed to agree on plans for dealing with the Red Locust assembling on Portuguese territory, that government objecting to control by foreigners on its territory. It is striking commentary on this disagreement that in November the locust position was again reported from South Africa to be serious, swarms of Red locusts invading the country from the North and North-West. One such swarm was estimated to be 22 miles long.

The only effective method of control of locusts is by the use of poison baits. Mechanical methods are out of date, and external insecticides not much good. So far no success has been had with any biological methods. The baits consist of three parts, carrier, poison, and attractant. The carrier can be horse manure, bran, sawdust, chaff or beet-root. The poisons are mostly arsenical. Molasses is sometimes used as the attractant.

Not only has the Phase Theory given fresh direction to the war on locusts but the idea has suggested new lines of research in various directions.

These few examples do something to indicate not only the importance of insects to man but to show how essential knowledge and proper understanding of them is to his well-being. While we do not all have equal opportunities for field or research work yet each of us at times could contribute observations which would assist in the solution of similar problems, and so be of benefit to mankind.

For my information I have been indebted to the following books:—

- Four Centuries of the Panama Canal.* New York, 1906.
- The Panama Canal and its Makers.* London, 1909.
- Science from an Easy Chair.* Sir Ray Lankaster.
- Tracking Down the Enemies of Man.* Torrance.
- Mosquito Control in Panama.* Prince and Orenstein, 1916.
- Sanitation in Panama.* Gorgas, 1915.

- Destructive and Useful Insects.* Metcalf & Flint, New York, 1928.
Biological Control of Insects. Sweetman, 1936.
Insects of Australia and New Zealand. Tillyard.
Entomologist, November 1938.
Exodus, X.
Locusts and Grasshoppers. B. P. Uvarov, 1928.
Phases of Locusts in South Africa. Faure, 1932. (From *Bulletin of Entomological Research*, XXIII, Pt. 3, September 1932.)

THE FAMILY CYRTIDAE (DIPTERA).

By H. W. ANDREWS, F.R.E.S.—Read 14th April 1938.

(Plates III, IV.)

I have chosen this Family about which to speak to-night as it seems, to my mind, to lend itself very well as a subject for a short paper, being sharply defined from other Families in the Order both by the peculiar life-history of its members, and by the distinctive appearance of the adults.

All the species, whose life histories are known, are parasitic in the larval stage on spiders, reversing the traditional relationship between spiders and flies; and the females, like those of *Meloë* beetles, lay enormous quantities of eggs, of which only very few can hope to attain maturity. As a result of this habit the egg-masses are more obvious than is usually the case in Diptera, and more is known about this stage of development. For example, Maskell has recorded from New Zealand that some twigs of apple covered with a black substance, amongst which were crawling several large flies, were sent to the Colonial Museum with an enquiry as to a new kind of blight. The sooty-black covering appeared at first sight to be the usual fungus accompanying scale-insects, but closer examination showed that the black mass was really formed by many thousands of eggs covering the twigs.

There is a full and interesting account of the oviposition of an American species, *Pterodontia flavipes*, Gray, by J. L. King, in "The Annals of the Entomological Society of America" [Vol. IX (1916), pp. 309-32]. He writes as follows:—"On 7th August, whilst passing the border of an open hickory grove, the writer observed several large flies hovering up and down the trunks of some large hickory trees. The capture of one of these proved the species to be *Pterodontia flavipes*. The flies were observed for some time: they hovered up and down the tree trunks from about 1 to 10 or 15 feet. They flew always on the leeward side and from one to two inches away from the surface of the bark. Occasionally they would come to rest on the bark, and at these times they were so sluggish that it was possible to pick them up in one's fingers. Though the flies were observed very closely, they were not seen to deposit eggs or to pay any attention to the grey jumping spiders that crept over the bark.

"Upon returning to the laboratory and transferring a living specimen to a bell-jar, it was noticed that the handkerchief in which it had been carried was sprinkled with minute black specks, which, on examination, proved to be eggs. The eggs contained in the handkerchief were removed to a watchglass by means of a soft brush. Many were lost or crushed during the process, but those remaining numbered 2300. All these were deposited by a single female in a period of under 45 minutes.



Photo. A. W. Dennis.

Fig. 1: ACROCERA GLOBULUS, $\times 4$.

Fig. 1A: ACROCERA GLOBULUS, $\times 24$.



Photo. A. W. Dennis.

Fig. 2: *ONCODES GIBBOSUS*, $\times 4$.

Fig. 2A: *ONCODES GIBBOSUS*, $\times 24$.

Further observation revealed the fact that the eggs were forcibly discharged from the ovipositor in extremely rapid succession, and that when first deposited were covered with a sticky substance that caused them to adhere to whatever they hit or fell upon. The following day some of the trees in the grove were banded with strips of white paper. After a brief period two flies appeared and by the aid of the white strips their actions were easily interpreted. By watching closely as the flies hovered over the paper strips one could see the eggs appear on the paper as minute black specks sprinkled in irregular rows. An examination of the bark of the trees showed the leeward side of each tree to be liberally sprinkled with thousands of eggs. One of the flies was bold enough to hurl her eggs on the face and hands of the writer while making this observation.

A second series of egg-counts was made from three females as follows:—No. 1, 987; No. 2, 3344; No. 3, 3977. Most were deposited during the morning of the first day after capture, and in no case did the flies live for more than two days."

The newly hatched larvae, which resemble the triungulin form of *Stylops* larvae, are very active, moving by looping, and jumping with the aid of their tail bristles. They are armed with scale-like plates and spines, which are presumed to enable them to penetrate into the body of their host by the articulations of the legs and cephalothorax. In laboratory conditions some newly hatched larvae were placed with bark and spiders; most died in three days and none could be seen after five days. On the seventeenth day one of the spiders died and after dissection twenty-seven larvae were found, eight in the palpi and legs and nineteen in the cephalothorax.

The period of incubation seems long. In the case of *P. flavipes*, Mr King states that eggs deposited on 7th August did not emerge till 7th and 8th September. In another American species, *Opsebius diligens*, O.S., the incubation period is given as 49 days. The larval stage is also lengthy. King records the occurrence of first-stage larvae in their host in November, seventy-nine days after entrance, and is inclined to believe that growth does not take place till after the hibernation of the host. In its mature stage the larva has been described as a soft white maggot having a constriction towards the head, giving a flagon-shaped appearance. It is 8-9 mm. in length, smooth, and devoid of scales or spines. Brauer has stated that it is amphipneustic and that it breathes by placing its caudal spiracles in one of the lung chambers of the spider. When full fed the larva eats its way through the abdomen of the spider and pupates straightaway. Apparently by this stage only one parasite is left and its emergence coincides with the death of its host.

In contradistinction to the earlier stages, the pupal period is of short duration, seven and twelve days being recorded for an American and an Australian species respectively. The pupa is smooth and without any obvious structural excrescences, but the various adult parts are easily discernible.

Various Families of spiders appear to be liable to parasitism by Cyrtid larvae:—*Avicularidae*, *Theridae* and *Drassidae* are quoted by Verrall, and *Lycosidae* by American authors. Of these the *Avicularidae* includes the Trap-door Spiders. *Theridae* are of sedentary habits and closely allied to the geometrical web-spinners (*Epeiridae*), and *Lycosidae* are the well known Wolf or Hunting Spiders. Except the *Avicularidae*, representatives of all these Families occur in Britain.

The adult flies are of very distinctive appearance with a prominent bulbous thorax, hence the appropriate name, *Cyrtidae* (Greek = hump-backed). The chief characteristics, apart from this, are the small, sometimes minute, head, and the very large ("gigantic" of Verrall) thoracic squamae. Most of the head is taken up by the eyes, which are contiguous in both sexes. Some exotic families have a long proboscis, in others it is insignificant, and in our British species very short or absent altogether. The position of the antennae varies from the top to the bottom of the head and is used for generic distinctions. The abdomen is mostly globular and puffed out, the legs simple, claws and pulvilli long, and the whole insect devoid of bristles. There is a distinctive venation and in several genera the veins tend to be incomplete. This may be a correlation with the sluggish habits of the adults and the "floating" flight referred to by some authorities. The wings are longer in the female than in the male. In exotic species these flies are often of a brilliant metallic coloration, but our British species are of a dullish white with variable black abdominal markings. The Family is of world-wide distribution, and though certain species have been recorded as locally abundant, the flies are on the whole rare. There are a number of European species, mainly occurring in the Mediterranean region; but we have in Britain two genera, *Acrocera*, with one species, and *Oncodes*, with two.

In 1909, the date of publication of Verrall's volume on *Stratiomyidae*, etc., which includes the *Cyrtidae*, there were no Scotch or Irish records given for our three British species, and none in England north of Herefordshire. Verrall records *Acrocera globulus*, Panz., from a number of localities in the South and West, with dates from 10th July to 13th August, and notes that it sometimes occurs in great abundance in the New Forest. There is a note in the "Entomologist's Monthly Magazine" for September 1902 (Second Series, Vol. XIII, p. 205) by the Rev. H. S. Gorham, recording the finding at Emery Down of some 50 specimens that had been stored in a hollow thistle stem by the wasp, *Crabro interruptus*, D.G. *Oncodes gibbosus*, L., is stated by Verrall to be abundant sometimes in the New Forest, "beaten from old white-thorn bushes at the end of June and beginning of July." He records it from Herefordshire and Suffolk. His dates for this species are 26th June to 5th August, and he notes the dates for males being in June and July, and for females in August. *O. pallipes*, Latr., is only recorded by him from Glamorgan, Somerset, Dorset and Herefordshire; June to beginning of August.

In conclusion, I would emphasise that this paper is a compilation only and does not embody any original work, but I have been persuaded to allow it to be published on the ground that, by bringing together a number of facts from scattered sources, some of our field workers may be encouraged both to look out for these Diptera and extend our knowledge of their distribution, and possibly to work out and check by actual observation the details of their interesting life-histories.

APPENDIX (from Verrall, "British Flies," Vol. 5).

British *Cyrtidae*.

Antennae placed at the top of the head near the ocelli; proboscis short and stumpy. *Acrocera*. Fig. 1 ($\times 4$) and 1a ($\times 24$).

Antennae placed at the bottom of the head near the mouth; proboscis entirely absent. *Oncodes*. Fig. 2 ($\times 4$) and 2a ($\times 24$).

Acrocera globulus, Panzer. Wings hyaline; radial vein obsolete; legs yellow with tip of tarsi black.

Oncodes gibbosus, Linnaeus. Squamae bone white with pale margins; halteres orange or brownish; femora mainly black.

Oncodes pullipes, Latreille. Squamae smoky with blackish margins; halteres black; legs entirely pale luteous.

I have to thank Mr A. W. Dennis for his kindness in photographing the specimens figured with this paper.

INSECTS AT LIGHT.

By C. G. M. DE WORMS, M.A., Ph.D., F.R.E.S.—Read 28th April 1938.

The Attraction of Insects, and in particular of the Lepidoptera, to many types of illumination is a phenomenon which was noted by the Ancients, but still remains a puzzling problem to-day. The expression "like a moth round a candle" is commonplace in our language, but the fact to which it refers is difficult to explain satisfactorily. However, I do not wish to dwell too much on the scientific and theoretical side of this interesting question, but chiefly to give some account of the methods to which most of us resort in the field to capture insects at light, together with many observations as to the behaviour of various groups under different conditions of terrain, weather, temperature, etc.

The means we adopt to obtain insects by attracting them to light has certainly greatly altered from those which must have been used a century or more ago, when this form of collecting was, to say the least of it, in its infancy. In those days there were no electricity, no cars, and no searchlights. In fact there was not much more than the ordinary candle by which insects could be lured. The advance of science and the advent of all the modern forms of illumination, with which we are familiar to-day, have greatly added to our facilities for collecting insects and to our knowledge of their nocturnal habits and of the causes underlying them.

Naturally, in preparing some form of apparatus for attracting Lepidoptera to light, the quantity, i.e. the candle-power, of the type of light to be used, would appear, at first sight, to be the most important factor, but recent investigations tend to show that the quality of the light, chiefly with respect to its spectrographic properties, seems to be of almost equal moment. This question, however, I propose to deal with at a later period in this summary, as first I will go into the various forms of traps and other devices generally employed in the field to-day. Then I will pass on to observations on the behaviour of insects at light under different conditions of weather, environment, etc.

The chief modern methods for attracting moths and other insects to light fall into four main groups, comprising (1) car headlights, (2) vapour lamps, (3) the many types of moth-trap, and (4) high candle-power portable electric lights. The first differs from the last three in that it involves a definite beam thrown in one direction. As to the respective merits of each form of illumination, there is a great deal to be said for the single beam as it seems as it were to "suck" the insects from the surrounding herbage, or undergrowth. On many occasions I have tested headlights against 300 c.p. petrol or paraffin vapour lamps and in almost every instance the former have proved by far the more attractive. The

use and the position of white sheets to reflect the light as much as possible is also a great factor. There seems every evidence that the better the light is reflected the better the chance of an increased harvest of insects. After many nights of this form of collecting I have come to the conclusion that a white sheet placed on the ground at the foot of the headlights or beneath a vapour lamp is more advantageous than one erected vertically. In each case the light is able to be diffused and dispersed to its maximum extent. The only slight drawback to this method would seem to be on wet nights, when a sheet on the ground is liable to become sodden. The use of specially devised traps and of high-power electric light bulbs has greatly added to our knowledge of the behaviour of insects towards various kinds of illumination. Some recently constructed moth-traps have been very ingeniously designed and, in particular, one which is built in the shape of a large cube with obliquely placed glass on three sides and a door at the back. The whole is set on a pivot so that the trap can be revolved to face in whatever direction it seems best to throw the light according to the prevailing intensity and quarter of the wind. Another very profitable type of trap is that constructed in the shape of a small room in which is hung a high-power electric light. Sloping glass on three or four sides helps to lead the insects inside where after a short flight they soon find some corner in which to settle down. Other devices have been added by which the apertures can be shut at any given hour by an automatic time switch. A portable electric light of the order of 2000 c.p. has been also in vogue, and it is remarkable how these powerful lights seem to attract insects under unfavourable conditions, when a weaker light is apparently ineffective. When using any form of light, and especially traps, the keeping of exact records, so far as possible, of weather conditions, temperature, numbers of individuals and species, etc., is all important to obtain some idea of the correlation of the many factors which influence the attraction of insects. Such records have been very meticulously kept in connection with experiments carried out a few years ago in this field by Dr C. B. Williams at Rothamsted. Most interesting results have been secured and valuable deductions made from them.

The data obtained in this way brought to light many remarkable features in respect of the time of flight of the various species, their habits under varying conditions of weather, the proportion of the sexes and also of the different families of moths at each period of the season. This leads me to say something about a number of observations I have been able to accumulate through the continuous working of moth-traps and lamps throughout the year. In selecting a pitch for a light a number of things have to be taken into consideration, chiefly in connection with the type of terrain on which operations are to be carried out. Localities fall roughly into seven groups—woodland, heath, downland, marsh, pasture, sandhills, and coastal cliffs. In each of these terrains a different insect fauna can be expected. If collecting inside a wood when conditions tend to be cold I have always found it best to place the source of

light well among the trees or undergrowth. I well remember on one occasion, early in March, the temperature began to drop rapidly soon after dark. By setting my lamp in a well-sheltered position among the trees, I attracted a good number of *Apocheima hispidaria*, Schiff., whereas a friend with an even more powerful lamp in a clearing some little way off secured very few. I have had the same experience with *Odontsia carmelita*, Esp., on cool nights in early May, obtaining many more with a light in a thick growth of birch than in the open. The other types of terrain mentioned are as a rule lacking in sheltered spots. In these cases elevation is of advantage and importance. A good light placed on an eminence in such a position that it does not throw much shadow, but embraces a large area of illumination, has always appeared to have the best effect. This method may also have the advantage of attracting insects which tend to fly high.

Of all the factors influencing insects coming to light, weather conditions are certainly the most baffling. No hard and fast rule can be laid down in this respect. In the summer months, when the minimum temperature may be not less than 60° at night, we may go out with the eager anticipation of a bumper haul, but how many of these phenomenal nights, when every possible species seems to come, can we expect in a season? Seldom more than half-a-dozen. I have on several occasions known an extremely warm atmosphere when, no matter how much illumination is used, nothing is attracted. As an example, I was collecting on a heath in Dorset under very mild conditions in July, when a great deal might have been expected, but nothing came. The chief species we were after, *Coscinia cribrum*, L., were all sitting about on the heather shoots and taking no notice of the lamps. The following night when conditions seemed to be exactly the same this insect and many other choice ones came in numbers. The direction of the wind is an all important factor. I have seldom known much attracted to light when it is blowing anywhere from a northerly or easterly quarter. A large moon is not so disadvantageous as might be imagined, provided the temperature does not fall too rapidly. I have several times had quite good "bags" in the open with a full moon on warm summer nights. Any form of mist is above all the greatest curse of the field collector. With its onset all insect life seems to stop flying immediately. In choosing a site it is always therefore best to select one where fog is least likely to rise, and for this reason proximity to water should be avoided, if there is a tendency in the atmosphere to misty conditions. There are many other points to be considered in attempting to forecast the probability of the degree of attraction on any particular night. There is no doubt that the best occasions are those nights when there is a distinct thunder tendency.

It is nearly always the case, however, that the best period is directly after a heavy shower, or downpour, or even during light rain. There have been many times that I have sallied forth on what would appear to be an ideal night and drawn a blank. In almost every instance a

heavy amount of rain was imminent. In these circumstances insects will not move. Possibly the best night I have had with the lamp was immediately after a severe thunderstorm, when moths came in swarms.

The time of flight of moths and also the degree to which either sex is attracted in the various families, is also of great interest and it is only in recent years that a lot of valuable data has been obtained in this field. We all know that different species and groups of moths seem to have fairly fixed times of flight. For instance, in May, *Notodonta trepida*, Esp., can almost be timed to the minute for appearance at midnight, while later on the White and Buff Ermines come at the same hour. But it is very difficult to judge the significance of these times of flight, especially as there appear to be two distinct flights at night, the first at dusk and then after an interval of about an hour the species come according to their respective special times. The later flight would seem to be influenced by the mating attraction of the females. I think that it is generally accepted that most species have a definite hour for mating. That is why the majority of moths we get at light are males. When, as is sometimes the case, females are attracted, it is almost certainly when they are on an egg-laying expedition and this is usually early in the evening and quite often just after dusk. I have on many occasions taken females of *Saturnia pavonia*, L., *Bombyx rubi*, L., and several of the Prominents in this way. The time of flight of insects is also equally influenced by changes in temperature. On nights when cold conditions are liable to prevail soon after dusk the flight is a very short one, most Families, like the Prominents, coming about half-an-hour after dark in a rush and then, as it were, closing down for the night. If the thermometer goes up again a later flight may be anticipated. A good dusk flight is usually the indication of better prospects later on and, as one well-known collector has pointed out so often, the best captures are missed by the collector not staying late enough, especially in the summer months, when on most occasions some of the choicer species, such as the hawk-moths, only appear between 1 and 2 a.m. This I have often proved to be so, when running the moth-trap, but the advent of "summer time" has made a late session in the field sometimes out of the question. Again some groups of moths seem to favour different weather conditions. For example, the Geometers will almost always put in an appearance on cold nights, when very little else is attracted. From the above remarks it will be seen that it is wellnigh impossible to say what is an ideal night. We know that warm and cloudy conditions and a westerly wind are usually propitious, but by no means always. The minimum temperature at which insects fly appears to be about 45° in summer and 40° in the early and late months of the year.

The range from which insects come also affords much speculation. There are some who think that a moth may only be attracted when it is comparatively close to the light, that is to say when it is on the move in the immediate vicinity. No experiments have, I believe, been carried out with marked specimens to see whether this theory can be sub-

stantiated. It is, however, the case that species are taken at traps a long way from their known or customary habitats. I have several times taken heathland species in my trap, when the nearest heather was more than a mile away.

It may be possible to account for these unusual records by assuming that the particular insect is spontaneously wandering far from its normal haunts, perhaps in search of a new breeding-ground. There can be little doubt that moths, apart from the recognised migrating species, do tend to fly great distances from the localities which produced them. I have already made reference to the degree to which extremely powerful lights will attract, when it is most unpropitiously cold. It is quite possible that these are individuals which, in the course of movement further afield from their usual habitats, become lured when coming into the range of the light. The matter is a moot point which calls for a good deal more research and investigation, especially on the electrical condition of the atmosphere.

This brings me to say, in conclusion, something about the degrees of attraction and the relative efficacy of different qualities of light, chiefly in respect of the various wave lengths of the spectrum. In the early part of this century it was noticeable how many moths used to fly to the arc lamps, and there seems little doubt that the increased proportion of the ultra-violet radiation was responsible for the marked effect. Similarly it has been observed also that the red neon tubes are to-day equally attractive. The complex mechanism of the eye of these insects would seem to be adapted to different forms of light radiation and there is a field for much useful work to increase our knowledge of this subject.

In my foregoing remarks I have endeavoured to draw attention to the main features of, and observations on, this interesting problem which affords such a fascinating pastime in the field and at the same time an opportunity for delving into and attempting to solve yet another of Nature's mysteries.

INSECTS AND LIGHT.

By L. H. ENNIS—Read 28th April 1938.

In the following paper I propose to speak in particular of the attraction of insects to an indoor light. I have been capturing insects by this means for two seasons; owing, however, to lack of time detailed observations as to weather, times of arrival, etc., have only been kept during 1937.

My "apparatus" consists of an ordinary electric light fitting with a 30 watt bulb and a white porcelain shade. This hangs 3 ft. from the window in a room about 10 ft. by 15 ft., the walls of which are covered with a pale fawn-coloured paper. Owing to the size of the room and the position of the lamp, a large amount of light reflected from the walls must pass through the window—so that the general colour is decidedly yellowish, especially as the bulb is not of the frosted variety. The room is about 40 feet above the garden and, since the house is built on the top of the side of a valley, commands a clear view both directly across it to a wooded estate on the opposite side, a distance of about $\frac{1}{4}$ -mile, and right down it to the Royal Wimbledon Golf Course, at its nearest point about one-third of a mile away. I think it is due more to this exceedingly favourably placing, rather than to the particular form of light used, that collecting by this means is so successful.

In all, I have taken at this light 79 species of Macro-lepidoptera, comprising:—10 Bombyces, 38 Noctuids, 29 Geometrids and 2 Hepialids. It is, I think, worthy of note that only two species from the Notodonta group—*Phalera bucephala*, L. and *Lophopteryx camelina*, L.—have appeared, although *Cerura vinula*, L., *Pheosia tremula*, Clrck. (*dictaca* L.) and *P. dictaeoides*, L. all occur locally. *L. camelina*, L. has appeared on two occasions only, though it is certainly not rare in the district, and *P. bucephala* about five times, although some years it is definitely common. One or two species which have not been taken in Wimbledon of recent years and several not, to my knowledge, previously recorded, have appeared. Perhaps the most surprising captures are *Toxocampa pastinum*, Tr. and *Acontia luctuosa*, Esp. There are also some surprising absentees, notably *Phlogophora meticulosa*, L., which is regularly seen in the garden below.

As is the case with all light collecting, the majority of specimens taken are males. With those species in which the male has pectinated antennae the proportion has always been 100% male; among the Noctuae, roughly speaking, it is about 75% male. It is difficult to get an exact proportion in this group as, so far, although nearly 40 species have appeared, only *Agrotis exclamationis*, L. and *Noctua xanthographa*, Fb., have been sufficiently common to give any real idea. Among other

species, mostly Geometrids, the proportion is about 60% male, except that *Hepialus lupulinus*, L. is 80% male and of *H. humuli*, L., one female is the only specimen taken.

Light does not appear to have much attraction until about midnight. Odd specimens do come almost as soon as the dusk flight is over, but these seldom stay. In most cases, they do not even settle, but fly straight into the lighted room and out again. From about midnight, however, insects come continually and most of these remain until just before dawn when light ceases to have any attraction. Why insects always leave the sheet or, in this case, the room, so regularly before dawn, and yet are frequently to be found sitting under street lamps in the daytime, I do not know.

Many species, again chiefly those whose males have pectinated antennae, have a peculiar manner of coming to light. They always seem to arrive in short rushes of about half-a-dozen or more, followed by a lull of about 15 minutes and another rush. I say "seem" advisedly, as I have never been fortunate enough to witness one of those much-talked-of nights, when insects "literally" cover the sheet.—I am rather glad they have not swamped my bedroom.—How insects arrive under these circumstances I cannot say; it would be interesting to know if they still come in rushes or not. Perhaps someone else can tell us.

Lepidoptera are by far the most numerous visitors to light, and after them must come the Diptera—represented chiefly by very small species, which frequently swarm around the lamp, even on nights when Lepidoptera are not being attracted. Most other Orders are represented with varying regularity by a few species. Coleoptera generally put in an appearance before the night is out—the most common species being *Lucanus cervus*, L. and *Melolontha vulgaris*, Fb. Trichoptera, in any favourable locality, will always produce one or two specimens, generally of the larger species. Hymenoptera are regularly represented by the yellow Ophions and other species of the Ichneumon groups.

From the position of my lamp it will be apparent that certain insects at least will travel considerable distances to come to light. *Toxocampa pastinum*, Tr. and *Acontia luctuosa*, Esp. must certainly have come from the Golf Course, which, as I have said, is at least one-third of a mile away, while they may, of course, have come very much farther. *Leucania pallens*, L., *L. comma*, L. and *M. trigrammica*, Hufn. probably come from the same place. On the other hand, all the Geometrids that have been taken might, with three exceptions, appear anywhere. The exceptions are *Comibaena pustulata*, Hufn., *Plagodis dolabraria*, L. and *Boarmia punctinalis*, Scop. (*consortaria*, Hb.), none of which had previously been taken in the house or garden. The first named I consider to be a chance specimen from an old oak nearby, but the others were much too common to be explained in this manner and I can only suggest that they crossed the valley or, at any rate, that most of them did. In the case of *B. punctinalis*, this is not surprising, but I should not have thought *P. dolabraria* had a strong enough flight. Distance may

account for the lack of *Notodonta*, of which I spoke, but I have no evidence of this since those that have been taken might have come from several places.

Weather is a factor having a great influence on light collecting though, curiously enough, I do not think anyone can say for certain whether any particular night will be good or not. As a broad rule, however, it can be said that good nights are usually warm, dark and damp. Darkness is, I think, the only really essential feature, as I have, on occasion, made quite respectable captures when it was both cold and dry but never when there was a bright moon. In fact the best insects seem to appear on the worst nights, *Lophopteryx carmelita*, Esp. having been reported taken in a fog, while I have taken *Cucullia chamomillae*, Schiff. when it was freezing, and have seen Mr O'Farrell take *Notodonta trepida*, Esp. in a hail storm.

As a means of obtaining a fairly complete list of the moths of the locality, indoor light work is excellent, for there seem to be few species that are not attracted and it affords an easy means of collecting at any time of the year, but as a means of ordinary collecting, its value must vary with the fauna of the district. Its chief advantage over outdoor work is that it is much easier to have the light a good height above the ground—a most important consideration, especially in places where bushes abound, or where the undergrowth has not been cleared away. The true value of having the light well off the ground is rather well illustrated by the fact that every insect that comes either from the Golf Course or the wood across the valley completely ignores the attraction of about a dozen street lamps and any lights there may be in the houses in the valley; and yet they come in considerable numbers.

I have now used electric, acetylene and petrol lamps for attracting insects, and propose, if I may digress somewhat from the subject of electric light indoors, to say something about the other two kinds. The only place where I have seen acetylene work well is at Wicken Fen and there collectors using the Fen lamps caught rather more than we did using a very much more powerful petrol one. I think, however, that this was chiefly due to the fact that the Fen lamps are on a stand about 4 feet high, whereas ours was on the ground. When the petrol lamp was put on one of these stands the results were somewhat different. Of petrol lamps I have used the Primus and Tilley and, as far as collecting goes, there is little to choose between them. Petrol light seems, in fact, quite as attractive as electric if not more so, though it is interesting to note that when I tried a petrol lamp in almost the same position as the electric one, it proved entirely unattractive, though insects came that night in numbers both before and after.

Besides the usual white or yellow-white lights known to attract insects, some, at least, of the coloured lights are effective. Red neon, for instance, sometimes produces an amazing number of insects, often on nights when petrol is not very successful. Blue-green neon also has a lesser attraction. That, however, is all I am prepared to say about

coloured lights at the moment, though I hope to investigate them more fully later.

Finally, I should like to say something of the effect of light on "assembling." Last spring I bred three females of *Smerinthus ocellatus*, L., and attempted to assemble males at the same time as I was working the light. None came, however, until the light was switched off; immediately after that two arrived. No more came until I had re-extinguished the light after securing these; then another came. Later I discovered that they had no difficulty in finding the female when the light was on once they were in the room; but for some reason none of the six males came into the room during those times. This, I think, is curious as I have on several occasions taken *S. ocellatus* at street lamps.

THE MEDITERRANEAN AND OTHER FRUIT-FLIES.

By M. NIBLETT—Read 12th May 1938.

The Mediterranean Fruit-fly, *Ceratitis capitata*, Wied., is a member of the dipterous family, *Trypetidae*, or *Trypaneidae* as some students prefer to call the family.

The sub-family *Ceratitinae*, to which the species under discussion belongs, contains many species, some of which have only recently been discovered. Study of these more recent discoveries has caused the erection of many new genera and sub-genera, and also some generic changes in connection with the older species.

Some of the more recently discovered species are known to attack fruits of native plants, and a few of them rival *C. capitata* in their attacks upon cultivated fruits in the localities where they flourish. Other species infest flowers, and there are also a number whose biology is still unknown.

The life-histories of the fruit-feeding species are very similar. The eggs are deposited under the skin of ripe or nearly ripe fruit, and the larvae after hatching burrow into the flesh, which they consume. When the maggots are full-grown the infested fruits usually fall to the ground. The larvae then leave them and burrow into the earth to pupate. These larvae have in many species the power of performing leaping movements.

Ceratitis capitata is a very serious pest in warm climates. It was, I believe, first recorded from the Mediterranean area but has spread over practically the whole world and has established itself in localities where the climate is suitable. It occurs in East, West and South Africa, South America, Bermuda, Hawaii, Australia and in all countries bordering on the Mediterranean Sea. Records for India are, I understand, considered doubtful, and it has not yet obtained a footing in North America owing to the stringent regulations prevailing.

It attacks an extraordinary variety of fruits, both hard and soft, cultivated and wild. It has a marked preference for citrus fruits, but is far from particular. It has been recorded in addition from apples, grapes, plums, coffee, peaches and mangoes, also from wild plums, *Solanum*, *Opuntia*, etc. The life-history is similar to that of the fruit-flies in general to which I referred previously, and in the warmer parts of the world this species has numerous broods in a year, the life-cycle occupying 30-40 days.

Many methods of combating this pest have been tried. Poisoned baits, distributed in containers about the orchards, have been used extensively and a considerable amount of research has been carried out in various countries where the insect occurs in an effort to find the most effective bait which can be used on a commercial scale.

The males of the fruit-flies are attracted by odours of various substances. Paraffin oil strongly attracts the males of *C. capitata*, as also does Terpinyl acetate. 120 traps, baited with the latter substance in a sub-tropical fruit orchard near Durban, caught 58,500 males of *Pterandrus rosa*, Ksh., the Natal Fruit-fly, in six months. No effective olfactory attractants have been found for the female fly although many substances have been experimented with and ingenious methods employed to gauge the attractive value of each. In some areas spraying the foliage of the orchard trees with sweetened arsenate of lead has been found useful, but this only applies to districts free from rain or mist.

The larvae are attacked by parasitic Hymenoptera. In 1913 Dr F. Silvestri visited South Africa in search of parasites and succeeded in transporting living specimens of the Braconid, *Opius humilis*, Silv., to the Hawaiian Islands, where it became thoroughly established. It has come to parasitize a high percentage of *C. capitata* larvae, but the host insect still remains highly destructive.

It may not be out of place here to say a few words about our British species of Fruit-flies, of which we have three. *Phagocarpus permundus*, Har. larvae inhabit the fruits of hawthorn and barberry, and also have been recorded on the Continent from honeysuckle berries. This species normally pupates in the earth, leaving the fruits in October or November for that purpose, but it will also pupate amongst the decaying pulp and the seeds of its host plant, as the puparia of this species have been found in packeted seeds. It is single-brooded, the flies emerging in May and June. The larvae of *Gonioglossum wiedemanni*, Mg. are to be found in the berries of White Bryony, which they leave for the purpose of pupation during August and September, the adult fly emerging in the following June. The larvae of this species are at times heavily parasitized by the Braconid, *Opius testaceus*, Wesm.

Rhagoletis alternata, Fall. larvae are to be found in the fruits of our native roses and also at times in those of cultivated varieties. They may be found in the fruits from July to October, leaving them in the autumn to pupate in the earth. This species has also been known to pupate amongst the decaying pulp and seeds of rose-hips being saved for seed, the puparia eventually getting mixed with the seeds and so transported to other districts. Cherries on the Continent are attacked by two species of the genus *Rhagoletis* but it has not yet been established that they occur in Britain. In North America much damage is done by several species of the same genus to apples, cherries and currants, while another species infests walnuts.

It has been observed that frequently female fruit-flies make numerous punctures in a single fruit but only deposit one egg.

There is another sub-family, the *Dacinae*, containing many species which, in tropical and sub-tropical countries, are very destructive to fruit. Probably *Dacus oleae*, Gmel., the Olive-fruit Fly, is the best known, the larvae feeding in wild and cultivated olives in Spain, Italy, France, Africa and India. The eggs are laid in the fruit which, after

a time, drops off and the larvae when full-fed leave it to pupate in the soil. The loss to the olive producing community is very great and, as far as I know, no very successful methods of combating this pest have been found. The loss to Italy in 1915 was estimated to be £8,000,000.

The majority of the remainder of the *Dacinae* are divided into two more or less distinct biological groups, one infesting Cucurbitaceous fruits and being commonly known as melon or pumpkin-flies, while the other group attacks the pods of Milkweeds (*Asclepias* spp.).

Dacus cucurbitae, Coq., the Melon-fly, is probably the most serious pest and causes considerable financial loss to growers of Cucurbitaceous plants and tomatoes. In Hawaii the estimated loss in 1914 was about £200,000. Observations made there show that the incubation period is $1\frac{1}{4}$ to $1\frac{1}{2}$ days, the larval period $3\frac{3}{4}$ to 11 days, and the pupal period 10 to 14 days. Egg-laying does not begin until 14 to 17 days after emergence and a female fly may lay up to 1000 eggs. There are 8 to 12 broods in a year. There are many other species of this section which feed on pumpkins, melons, pawpaw, marrows, cucumbers, bananas and mangoes, also on native Cucurbitaceous fruits.

Those infesting Milkweeds are not, as far as I know, of any economic importance, but there are a few species known which attack both groups of plants and it may prove that further investigation will reveal some as being destructive to cultivated fruits.

The larvae of the *Dacinae*, like those of the *Ceratitinae*, are able to leap energetically.

The majority, if not all the species, of the *Dacinae* have the habit of frequenting definite roosting places, usually choosing the undersides of large leaves, where they will congregate in some numbers and to which they will return if driven away. The adult flies feed upon honey-dew secreted by Coccids.

It is not possible to make more than a general acknowledgment to the many authors from whose works the majority of these notes were compiled.

BRITISH ORCHIDS.

By H. R. HUTCHINGS.—Read 23rd June 1938.

(Plates V, VI.)

Our native Orchids belong to the natural order of plants known as the *Orchidaceae*, a group of highly specialised plants widely distributed throughout the world.

Orchids reach their highest development and most brilliant colouring in tropical regions, and comparison with the exotic species makes our own appear small and insignificant. They are, nevertheless, interesting and, from a botanical point of view, just as important. The indigenous species are all terrestrial, their roots invariably growing in the soil. Two species, however, *Liparis loeselii*, Rich., and *Malaxis paludosa*, Sw., are frequently found growing in swampy districts on sphagnum moss. *Epipogon aphyllum*, Sw., *Neottia nidus-avis*, Rich., and *Corallorrhiza innata*, R. Br., exhibit saprophytic tendencies, feeding on decaying vegetable matter.

It is difficult to state the exact number of species found in the British Isles as different authorities are by no means agreed upon this point, but the figure generally accepted is approximately 48. In addition, several well-marked varieties of various species are recognised. Confusion appears to exist in that group known as the "marsh orchids." Some authorities regard certain of these forms as merely varieties of the type, others accord them specific rank, but in view of the marked variation which the group exhibits it is difficult to say definitely where variety ends and species begins.

The various species are classified under 19 genera, as follows:—*Orchis* contains 16 species; *Gymnadenia*, 2; *Habenaria*, 2; *Ophrys*, 4; *Spiranthes*, 3; *Listera*, 2; *Epipactis*, 5; *Cephalanthera*, 3.

The following genera have each one species:—*Aceras*, *Neotinea*, *Coeloglossum*, *Goodyera*, *Neottia*, *Epipogon*, *Corallorrhiza*, *Malaxis*, *Liparis*, and *Cypripedium*.

The majority of the species are found in England, and a number of these are absent from Scotland and Ireland. Many species common in England are distinctly rare in these two countries. Ireland claims two species—*Neotinea intacta*, Benth., and *Spiranthes romanzoffiana*, Cham., which do not occur in either England or Scotland. Another species of the genus *Spiranthes*—*S. aestivalis*, Rich.—occurs in two places only in England and is extremely rare even where it occurs. *Goodyera repens*, R. Br., was formerly considered to be confined to Scotland, but it has recently been recorded from England. *Corallorrhiza innata* is confined to certain parts of Scotland, whilst *Cypripedium calceolus*, L., possibly our most beautiful orchid, and reminiscent of some exotic species, is now so rare that it has been said to be extinct.

It has been found in a number of northern counties, but is now probably confined to Yorkshire.

The chalk hills of Kent, Surrey and Sussex appear to be the most prolific hunting grounds for orchids. Thirty-four species have been recorded from Kent, whilst Surrey and Sussex are nearly as rich. Some species prefer limestone districts, some the bog or marshland, and others the chalk. Many species are both widely distributed and abundant where they occur, others are locally plentiful in restricted areas, whilst others are so rare as to be on the verge of extinction.

A curious feature of these plants appears to be the facility with which some varieties appear and disappear in certain localities. One year they appear in plenty in a locality; the following year none can be found; on other occasions they appear in localities where none had been noticed previously. Some of the more common species, however, remain fairly constant. *Ophrys apifera*, Huds., exhibits this tendency to disappear from localities, and certain species of the genus *Epipactis* have similar habits. The sporadic appearance of *Orchis hircina*, Scop. is also well known. The explanation of this phenomenon probably lies in the fact that, although all orchids are perennial, they do not bloom every year and, the leaves being often insignificant, detection of the plants in the surrounding herbage, except when a flower stem is present, is extremely difficult. The plants may not always appear above ground, the tubers remaining dormant, sometimes for long periods. *Epipogon aphyllum*, Sw., our rarest species, is said to lie dormant for as long as ten years. This is the probable explanation of its extremely rare and sporadic appearances—about three times in the last fifty years.

Another remarkable feature in connection with the distribution of these plants is the extremely restricted area in which some of the more uncommon species grow. A small corner of a field, a patch of grassy downland, a small copse, in the extreme edge of a wood. All these places may support a few plants—seldom many, whilst the surrounding land of apparently exactly the same soil and other conditions produces none. The reason for this is somewhat obscure, but the explanation probably lies in the presence or absence of certain fungoid growths in the soil which are vital to the existence of the plants. *Rhizoctonia repens*, Mass., and allied species of fungus are invariably present where orchids grow. If for any reason the fungus disappears then the orchids disappear also.

The situation and soil in which the plants grow often have a marked effect upon their growth. Generally those which will grow in moist as well as dry situations are normally more robust, with larger flower spikes and richer colouring when growing where the moisture supply is ample. In drier situations the plants are generally inferior in size and the flowers often appear of a paler tint. *Orchis maculata*, L., may reach a height of two feet in a damp situation in rich loam soil, whereas when found growing on a dry chalky hillside it will seldom exceed nine inches. The colour varies from deep purple to pale lilac and occasionally pure

white specimens are found, but these are by no means common. On acid or peaty soils the normal type is replaced by a smaller species, *Orchis elodes*, Gris. This plant was formerly classified as a variety of *Orchis maculata*, L., under the name of *Orchis ericetorum*, Linton. It is, however, now considered to be a definite species.

Various characteristic features render the recognition of our orchids from other wild flowers a fairly simple matter. The identification of particular species is not always, however, so easy. In size they range from about three inches in height up to about three feet, or possibly more. With the exception of two species, *Epipactis violacea*, Boreau, and *Cypripedium calceolus*, L., which often bear multiple flower stems, a single stem, surmounted by a dense or loose spike of flowers, is characteristic of these plants. In some species, particularly those of the genus *Ophrys*, the flowers are few in number, borne loosely at intervals up the stem, the number of flowers ranging usually from two up to about ten. In the genus *Orchis* the flower spike is usually dense and compact, the number of individual flowers being often extremely high. *Orchis hircina*, L., one of our rarest species, sometimes reaches a height of about thirty inches and produces a spike of flowers eight to nine inches in length. A specimen has been recorded with ninety individual flowers on the spike, but this would be rather an exceptional specimen. Two further examples may be mentioned as showing the extremes reached by the flower spikes in different species. In *Neotinea intacta*, Reich., the flower spike is small and very dense, whilst in *Orchis laxiflora*, Lam., the spike is long and loose. The specific names in these two species, of course, indicate the nature of the flower spike.

Epipactis violacea, Bor., produces a number of flower stems, an unusual feature where our indigenous species are concerned. The number of stems varies from one or two up to about thirty, or possibly more, and often reach a height of three feet. These long flower stems, however, seem often unable to support their own weight and frequently droop in sinuous curves around the plant. The inflorescence is loose, and the number of individual flowers on the stems often exceeds fifty. *Epipactis latifolia*, Sw., closely resembles *E. violacea*, and it is not always easy to differentiate between the two. The flowers closely resemble each other, but the leaves and stems of *violacea* are normally flushed with a purple tint which is absent in *latifolia*.

The rootstock of our native species usually consists of two oval shaped tubers. The larger generally has a somewhat shrivelled and wrinkled appearance, and bears the leaves and flower stem. The other, which at this time is in the process of development, will support the leaves and flower, if any, the following year. The plants sometimes increase from the roots, although such increase appears to be extremely slow. It is by no means unusual to find the plants in such close proximity that they appear to be emerging from a common rootstock. This is not so, however. A plant on reaching its maximum growth may die down and the following year be replaced by two or more smaller ones. Several

years may elapse before the plants bloom again. *Orchis mascula*, L., our commonest species, has four or five lobes projecting downwards from the tubers. From this peculiarity the plant was at one time called "Dead man's fingers." *Orchis maculata* has a somewhat similar rootstock, but the lobes are much longer. The bulbous type of rootstock is not, however, common to all our species. In that group known as the Helleborines the roots are of a fibrous nature, dense and matted. These species, with the exception of *Epipactis palustris*, L., and *E. rubiginosa*, Crantz, are always found in dense woods, particularly where beech trees are present, and where a thick carpet of decayed leaves exists. *Epipactis palustris* is only found in marsh or swampy meadows, whilst *E. rubiginosa* is confined to a few limestone districts.

The branching rootstock of *Corallorrhiza innata* is said to resemble coral; hence its name. Similarly the twisted and knotted roots of *Neottia nidus-avis*, Rich., bear a fancied resemblance to a bird's nest, and here again the name is derived from this peculiarity.

In *Epipogon aphyllum*, Sw., the rootstock is thick and fleshy. Little is known of the habits of this species, as it only appears at long intervals in dense woods growing amongst decaying leaves.

The three last mentioned orchids are peculiar in so far as they possess no leaves, or any other green parts, but only a few bracts of brownish colour clasping the stems. It is obvious, from a glance at these plants, that they do not exist by normal means, for which the existence of chlorophyll in their cells would be necessary. They do not exist by feeding on living plants, so they are not parasites. They exist by feeding on the decaying remains of plants that have died, and are consequently saprophytes. Their normal habitat has already been described, and their thick fleshy roots are enabled to extract the nutriment they require from the decaying vegetation by the aid of a root fungus.

The appearance of *Neottia nidus-avis* is unusual, and indicates the nature of its existence. In colour it varies from a dirty yellow to a deep brown, the stem being generally a little lighter in colour. The plant, even when in full bloom, has the appearance of a flower that has withered and is dead. The orchid is widely distributed and is plentiful in the beech woods of the south-eastern counties.

The leaves of orchids spring from the crown of the tuber, and in the majority of the species are few in number. In *Habenaria chlorantha*, Bab., and *H. bifolia*, R.Br., and in *Listera ovata*, R.Br., two leaves only are produced, although occasionally there may be more. In the first two species a number of small bracts are usually found clasping the stem at intervals. It is not always easy to differentiate between *chlorantha* and *bifolia* as they closely resemble each other. Usually, however, *chlorantha* is a more robust plant than *bifolia*, but this is by no means always the case. The main difference is to be found in the anthers—in *chlorantha* the two anthers are divergent, and in *bifolia* parallel. The leaves of these two species are broad and rounded at the tip and are frequently found to be covered with a pale silvery sheen.

Most of the species produce considerably more than two leaves. In some cases they form small rosettes on the ground and in others they stand more upright. In some species they almost clasp the stem and continue alternating up it for some distance as in the Helleborine group, in which the leaves are usually pointed and strongly ribbed.

A great deal of variation is found in the shape of the leaves of other species. In the genera *Ophrys* and *Spiranthes* the leaves are small and insignificant, narrow and bluntly tapered. In the genus *Orchis* the leaves usually attain larger proportions. The leaves of *Orchis purpurea*, Huds., are numerous and, by comparison with their length, fairly broad, tapering to a blunt point. In a well-developed plant they stand up boldly around the flower stem; in others they lie almost flat on the ground and when decaying have a pleasant aromatic odour. Narrow sword-like leaves are characteristic of *Gymnadenia conopsea*, Benth., and *Orchis pyramidalis*, L. In these species the leaves are long and narrow and sharply pointed. In *Orchis mascula* and in *Orchis maculata* the leaves are heavily blotched with purple spots. Unspotted leaves, however, often occur.

The flower stem usually springs from the centre of the leaves, the bud making its appearance almost as soon as the leaves have pushed through the surface of the soil. The flower spike of *Spiranthes autumnalis*, Rich., is usually found outside the small rosette of leaves which appear after the stem. These leaves will actually bear the following year's bloom, if any; but by that time they will probably have decayed and the flower spike will be apparently leafless. The flowers of all the species classified under the genus *Spiranthes* grow in a spiral around the stem.

The flowers of orchids are of fairly simple construction, consisting of three sepals and three petals alternating with each other. The three sepals are uniform, and two of the petals occupying the spaces between the sepals are similar. The third petal is usually elaborated into some bizarre form, often beautifully coloured with either spots or lines and is known as the lip. This is deeply divided into two or more lobes, frequently bearing a striking, or perhaps fanciful, resemblance to some insect or object, from which the orchid takes its popular name. In *Aceras anthropophora*, R. Br., the lip is cleft at the tip into two long lobes, whilst two smaller lobes project at the sides, giving the lip a slight resemblance to a small man, and from this resemblance the plant has been named the "Man orchid."

In the majority of the species the resemblance of the flowers to the various objects after which they are named is more fanciful than real, but in the four species of the genus *Ophrys* the lip reaches its most remarkable development, and here the resemblance is striking and no imagination is needed to observe it. In the "Spider orchid," *Ophrys aranifera*, Huds., a species locally plentiful in a few places in South-East England, the lip closely resembles a garden spider, whilst in *Ophrys apifera*, Huds., and *O. muscifera*, Huds., the resemblance of the

former to a bee and of the latter to a fly is most marked. The other two petals in these have been so modified as to resemble the insect's antennae and still further serve to heighten the illusion. Considerable imagination is required to observe the likeness to a butterfly in the lips of the two species *Habenaria bifolia* and *H. chlorantha*, or to a lizard or frog, in the case of *Orchis hircina* or *Coeloglossum viride*, R. Br.

In some of the genera, particularly *Orchis*, *Gymnadenia* and *Habenaria*, the sepals and the two upper petals combine to form a hood, from the base of which the lip projects. The lip is frequently continued backwards to form in some cases a short blunt spur, in others a long slender one. Nectar is secreted in the spur in some but not in all species. Within the hood lie the reproductive organs. The single anther is divided into two lobes, each containing a pollen mass. The two lobes lie close together and are normally parallel. Beneath the anther, and above the opening to the spur, lies a viscid patch known as the stigma. The pollen masses are club-shaped, with a slender stalk, to the base of which is attached a sticky disc. The twisted footstalk of the flower forms the ovary or seed capsule, which, after fertilisation has taken place, swells and contains a vast number of very fine dust-like seeds.

Fertilisation is normally carried out by insects which, in their endeavour to extract nectar from the flowers, press against the base of the pollen masses. These readily adhere to the insect's head, where their weight quickly causes them to fall forward on their slender stalks. A visit by the insect to another flower brings the pollen into contact with the sticky surface of the stigma, to which the pollen grains adhere and fertilisation takes place.

In *Cephalanthera grandiflora*, Bab., fertilisation is not always carried out by insects. The flowers of this orchid seldom open fully, making it difficult of access to insects. The lip, however, closes up as the flower dies and presses the pollinia against the stigma, self-fertilisation thus taking place. The two species of *Habenaria*, *H. bifolia* and *H. chlorantha*, are pollinated by night-flying moths. The spur in these species is long and slender and contains a large quantity of nectar, but only the long proboscis of a moth can reach it. The flowers are of a greenish white colour, as is usual in flowers that rely on night-flying moths for pollination. At night a strong and extremely pleasant perfume is emitted by these plants, which doubtless constitutes a still further attraction to the insects on which they rely for fertilisation.

In the genus *Ophrys* the hood is absent, the sepals and the two upper petals being separate and distinct. The extraordinary mimicry which is displayed by the four species of this genus has already been commented upon, but so far nobody has been able to account satisfactorily for this counterfeit presentment. It has been suggested that it is for the purpose of keeping insects away, but this can hardly be the case as three out of the four species rely on insects for pollination. In these species the

anthers form a small hood with a projecting bird-like beak. The two pollen masses lie beneath this hood, and confer upon it an appearance somewhat resembling an insect's head with two large compound eyes. *Ophrys apifera* is self-fertilised normally, although in some instances it may possibly be fertilised in the usual way by insects. Soon after the flower bud has expanded, the two pollinia, which are attached to long and very slender stalks, fall by their own weight forward, and eventually droop far enough down to make contact with the stigma, which lies immediately below, when fertilisation takes place.

The flowers are succeeded by ribbed capsules that open by three valves to liberate the enormous quantity of imperfect seed so characteristic of orchids. Orchid seeds are unlike the seeds of ordinary plants, in so far as after they have left the capsule they do not contain a miniature plant ready to develop into a seedling, when subjected to suitable conditions of temperature and moisture. Germination in orchids cannot take place unless the seeds chance to fall upon soil which is impregnated with an orchid fungus. This is a remarkable feature in connection with the seeds of orchids, and it would almost appear that fertile seeds require fertilisation by the fungus before germination can take place.

Orchids do not normally increase to any great extent and from this fact it is apparent that germination does not easily take place. About five to seven years usually elapses before a seedling reaches the flowering stage.

In no family of plants is such a wide range of colours found as in the orchids. Our native species exhibit a wide variety, although various shades of mauve or purple appear to predominate, but green, yellow, white, red, and even brown, a colour by no means common amongst flowers, can be found. Considerable variation exists in plants from widely separated localities—soil, climatic conditions and moisture, or lack of it, all play their part in bringing about variation from the normal.

Albino varieties of most species occur, but are generally rare. They appear to occur more frequently in the species of the genus *Orchis* than amongst the other genera. An unusual variety of *Orchis purpurea*, in which the purple hood is replaced by one of pale green, the lip being pure white, is occasionally found. In Ireland a pure white form of *Orchis maculata* with unspotted leaves occurs and has been named *O'Kellyi*, Druce.

Few of our orchids can be described as sweetly scented, although quite a number have a distinctive perfume. The sweetest are undoubtedly *Habenaria bifolia* and *H. chlorantha*. Their scent is strong and delightful, especially during the evening after a shower of rain. *Gymnadenia conopsea*, Br., is strongly scented, but its scent could hardly be described as pleasant, although it is known as the "fragrant orchis." The musk-like odour of *Herminium monorchis*, R.Br., is stronger at night and is scarcely perceptible during the day. In *Orchis mascula* and *Orchis*

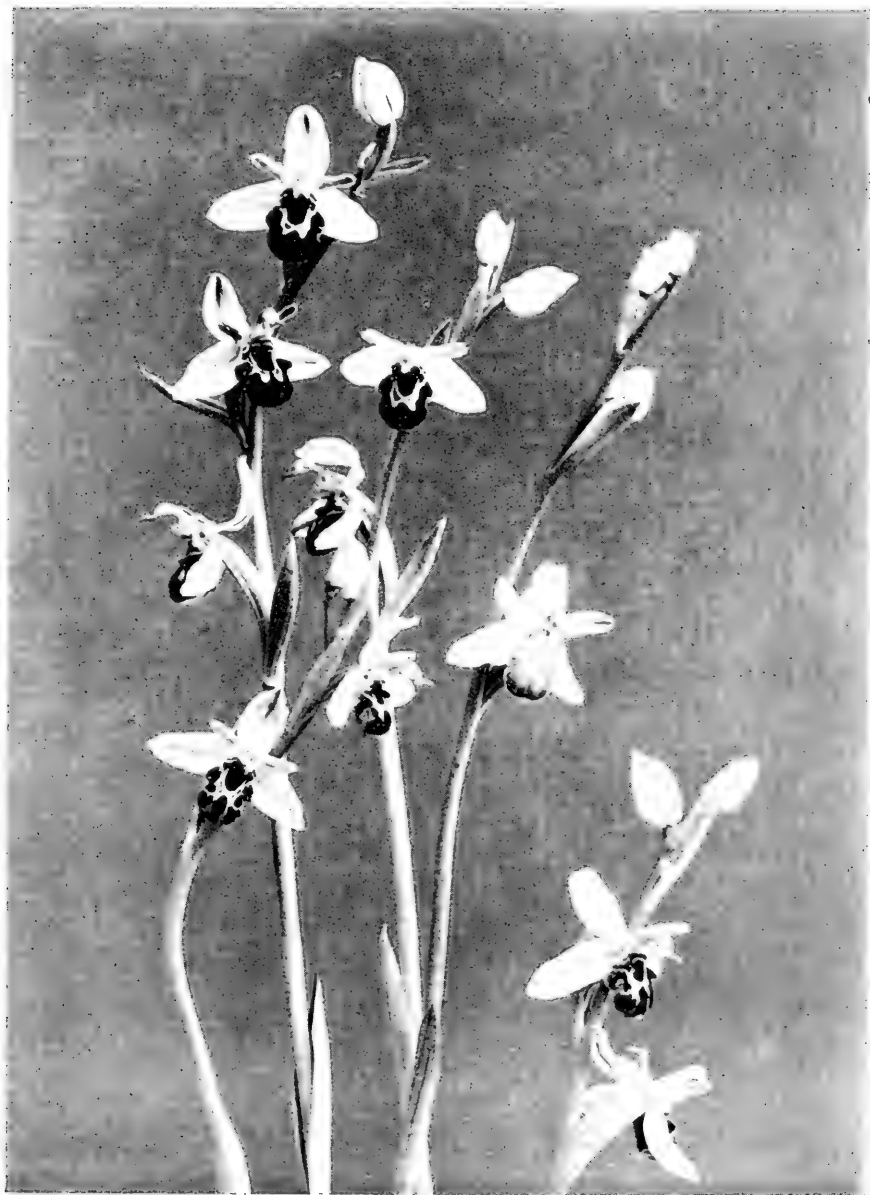


Mr Dennis exhibited a number of photographs mostly of orchids to be found in the Home Counties, including remarkable aberrations of the Bee orchis and the Fly orchis.

The white variety of the Bee orchis is not uncommon in Kent and Surrey, and perhaps elsewhere. It is recorded in Hanbury's *Flora of Kent*. On one occasion when the type was very abundant half-a-dozen or more were found without making any special search for them. The sepals and two upper petals are pure white and the lip greenish-yellow with the usual lighter markings.

The Fly orchis illustrated is perhaps unique. It was found at West Horsley, Surrey, and was noted for two seasons before being taken to be photographed. All the green parts of the flower were pure white, including the bracts and the stem down to the first large bract. The lip was a light red brown, broad and flattened with the usual blue spot wider and white.

A. W. D.



THE BEE ORCHIS (White var.).

Photo. A. W. Dennis.



THE FLY ORCHIS (White var.).

Photo. A. W. Dennis.

hircina the scent is definitely unpleasant; the latter resembles that of a goat.

Hybrids occur fairly freely between certain of our orchids. The occurrence of hybrids is naturally governed by the proximity of the various species to each other, and the coincidence of their times of flowering. Hybrids are of two types. Those occurring between different genera are known as 'bi-generic', whilst 'interspecific' hybrids occur between different species of the same genus.

Taking first the interspecific hybrids, crossing has been recorded between all the species in the group known as the "marsh orchids," and including *Orchis maculata* and *Orchis elodes*. This group contains six species and with the exception of *O. elodes* are at times found growing in close proximity, but in view of the marked variation exhibited by these species, the identification of hybrids is by no means easy.

A hybrid between *Orchis laxiflora*, Lamk., which is found only in the Channel Islands, and *O. morio*, L., has been recorded and named *O. alata*, Fleury. Several interspecific hybrids have been recorded between the species of the genus *Ophrys* but, having regard to the normal times of flowering of the different species, these hybrids must be of rare occurrence. *Ophrys arachnites*, Lam., a very rare and local species, found only in a small locality in the south-east of England, blooms during the latter half of June, at which time *O. apifera*, Huds., is also in bloom in the same locality; not unnaturally hybrids occur between these two species.

Hybrids between *O. arachnites* and *O. aranifera*, between *O. aranifera* and *O. apifera* and between *O. aranifera* and *O. muscifera* have also been recorded, but it is difficult to understand how all these can occur. *O. aranifera* blooms sometimes as early as the middle of April and seldom lasts later than about the first week in May. *O. muscifera* might just possibly be in bloom by then, but it would be early for this species, which in any case does not generally grow in close proximity to *O. aranifera*. *O. apifera* and *O. arachnites* do not bloom until much later, so the chances of their crossing with *O. aranifera* are still more remote. There is no record of any hybrid occurring between *O. muscifera* and *O. apifera*, and from the habits of the two species this would be hardly likely to occur. *O. muscifera* generally grows in woods or on the edges of small copses and has generally finished blooming by the end of May. *O. apifera*, on the other hand, favours open chalky slopes and grassy banks and is seldom in bloom before the early part of June. It must, however, be borne in mind that abnormal seasons, in which the Spring is exceptionally mild or perhaps cold, are not of infrequent occurrence in this country and such seasons have a marked effect upon the times of flowering of the various plants. The earlier species may be retarded and still linger on until later ones are in bloom, thus affording opportunities for hybridisation that do not occur in normal seasons.

Turning now to the bi-generic hybrids, there are records of a number of different hybrids between *Gymnadenia conopsea* and a number of species of the genus *Orchis*. This species is generally found growing on dry chalky slopes, often in great abundance, together with *Orchis maculata*, *O. elodes*, *O. pyramidalis*, *O. purpurella*, and *Coeloglossum viride*. In such circumstances crossing between these various species is not unlikely.

The identification of hybrids is not always easy, but some features of both parents are usually present. The size, shape, and colouring of the lip, the length and thickness of the spur, the appearance of the sepals, petals, and stem, and the presence or absence of spots on the leaves, all afford clues which may assist in deciding to what species the parents belong. The different species growing in the locality will also form a useful guide.

Abnormal forms, in which the lip or petals have been modified, occasionally occur. In "peloric" forms the lip is absent, its place being taken by a third petal, which, in this instance, is uniform with the other two. Occasionally the spur is absent, and in other cases two, or sometimes three, lips have been present. Abnormal forms of *Habenaria bifolia* have been found in which the lip was much broader and shorter than the normal and the spur short and insignificant. An unusual form of *Ophrys apifera* occurs in certain localities. In this form the lip, which is of a brownish yellow colour, is narrow and sharply pointed and much smaller than in the typical form. Where it occurs this form is fairly constant and is now regarded as a variety under the name var. *trollii*, Heg. and Heer.

There appears to be little relation between the orchids and the insects except for the purpose of fertilisation. No larvae appear to feed upon them and they are singularly free from insect pests. Two species, however, *Epipactis latifolia* and *E. violacea*, are frequently found to be infested with a black fly which resembles the fly commonly found upon the broad bean, but no other orchid species appear to suffer in this way.

Unfortunately, several of our native species are gradually disappearing. A variety of reasons may account for this—natural causes, over which we have no control; the gradual development of the countryside for building purposes; the construction of new arterial roads; and the efforts of those misguided persons who endeavour to transplant wild flowers to their gardens (where they usually perish miserably), are all helping to deprive us of some of our choicer species. It is gratifying to know, however, that efforts are being made in certain directions to preserve some of the more uncommon varieties, and it is hoped that these efforts will meet with the success they deserve.

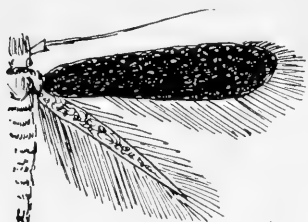


Fig 1 *B. nigricomella* Z



Fig 2. *B. cidarella* Z

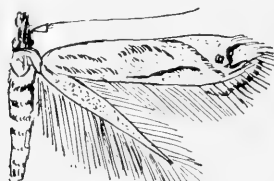
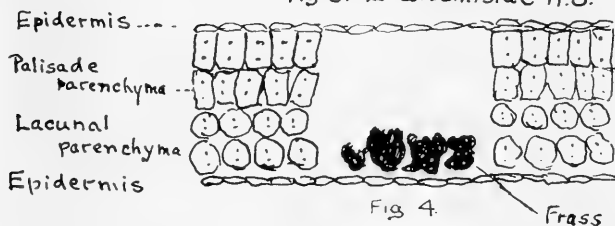
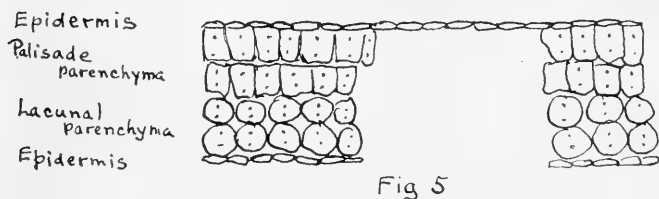


Fig 3. *B. artemisiae* H.S.



Section across
larval mine
(DIAGRAMMATIC)



Section across
larval feeding
place
(DIAGRAMMATIC)

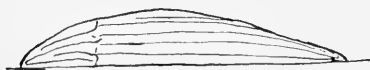


Fig 6

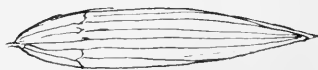


Fig 7

Pupal cocoon of *B. noltei*. Perry.



Fig 8
Pupa. *B. noltei*.

BUCCULATRIX.

**A CONTRIBUTION TO OUR KNOWLEDGE OF THE BIOLOGY OF
THE SPECIES OF THE GENUS BUCCULATRIX, ZELLER
(MICRO-LEPIDOPTERA).**

Part I.

By J. KLIMESCH (Linz à Donau).—Trans. and Read by S. N. A. Jacobs,
28th July 1938.

[Translated from *Lambillionea*, Nos. 8 and 9, 1937, with the kind
permission of Author and Editor.]

(Plate VII.)

Owing to the common origin of the genera *Lyonetia*, Hb., *Phyllobrostis*, Stgr., *Phyllocnistis*, Z., *Cemiosstoma*, Z., and *Opostega*, Z., in the family of *Lyonetidae*, the genus *Bucculatrix*, Z., has been placed of recent years by some authors amongst the *Gracillariidae*. The relationships with the other genera in this latter family are, however, so weak as to justify placing *Bucculatrix* in a family to itself.

We have placed in the genus *Bucculatrix*, Z., only some homogeneous species of which about twenty are known in Central Europe (North of the Alps). The biology of many species is still unknown or only partly known.

This paper is not designed to consider the morphological differences of the species and I would only enumerate briefly the characters which particularly distinguish this group.

The extremely interesting biology, worthy of the admiration of all to any extent concerned with it, will be dealt with as fully as my personal experience and the state of present-day knowledge permit.

We are concerned here with little species whose wing expanse does not exceed 10 mm. The forewings are from five to seven times as long as they are broad, so they will be seen to be definitely narrow, and the flying aptitude of these moths is solely due to the long fringes on the inner and outer margins. The hindwings are also narrow and lanceolate and are also provided with long fringes. The scales of the forewings are, in the great number of species, scarcely noticeable, and in many species they are dull and without reflections. The colour and patterns are simple. *B. nigricomella*, Z., and *B. cristatella*, Z., are uniformly bronze colour, with a feeble metallic reflection; *B. cidarella*, Z., shows on a brownish ground two pairs of oblique white spots on the dorsum and on the costa. In all other species one could describe the pattern as being represented basically by a more or less long stria, arising from the base, a hook on the costa, and two spots, often joining, at half the length of the wings. The fringes of the wings have no markings, though some species show a feeble dividing line.

Variability is slight, but in *B. maritima*, Stt., it is important. One comes across examples neatly patterned whilst others are almost unicolorous. Sexual dimorphism does not appear. The long hair tufts of the head and smooth scales of the face are very characteristic in all species. There are no palpi, the proboscis is short, and the antennae are less than the forewings in length, the scape is thickened by strong scales covering the eyes, but never to so great a degree as with the *Nepticulidae*.

Certain species sometimes appear in large numbers and then one may observe them disporting near their foodplant during the afternoon. All the species have little inclination to fly and are naturally lazy, as opposed to the lively *Nepticulidae*. In the case of most species, there are two generations.

Although, with the exception of a few species (the *ulmella* group), the determination of the imagines does not present any great difficulties, it is preferable to advise beginners to breed even the common species; it is only thus that they can learn the biology of the species, unique of its kind, and it is the object of this paper to set this biology down.

The larvae of all species live during their early days within gallery-like mines; in one case they live in mines of spiral shape (*B. frangulella*, Goeze). They eat the palisade parenchyma as well as the lacunal parenchyma of the leaves. Ordinarily these gallery mines are short and often to be found in the angles of the nervures (*B. ulmella*, Z.) but sometimes these mines are elegant, proportionally long and little contorted (*B. noleti*, Petry), and in this last case they are somewhat reminiscent of the mines of *Nepticula*. There is, however, no difficulty in deciding to which group a mine belongs, if an occupied mine be examined against the light, with the aid of a magnifying glass. If the larva has thoracic legs, it can only be a *Bucculatrix* larva, for the larvae of *Nepticulidae* have only abdominal legs. The empty *Bucculatrix* mine is so short that it could scarcely have provided food for a half-grown *Nepticula* larva, but then it is known that these latter larvae do not leave the mine for the purpose of pupation.

The young *Bucculatrix* larva has a smooth skin. It is furnished with sixteen feet. With few exceptions it is almost without markings, and the colour is most often a flat yellowish or greenish. On the approach of the first ecdysis, the larva leaves its feeding place on the back of the leaf (where the mine itself is transparent) and makes for itself in the angle between two sufficiently strong nervures a moulting web constructed of flat threads. Most often these webs take the form of a very characteristic disc, vary from whitish to yellowish, and are of such delicacy that the larva may be easily seen under it curved in the shape of a horse shoe. After two or three days, the moult being accomplished, the larva leaves the moulting web completely changed in appearance, and lives openly on the back of the leaf (with the exception of *B. gnaphaliella*, Treitschke), there producing very characteristic traces of feeding, betraying its presence even more clearly than by the early mines,

which at first are not very apparent. The larva then eats more or less large patches of varying shapes in the tissues of the leaf, at the same time devouring the inferior epidermis as well as the two layers containing chlorophyll. Though some species eat the nervures rich in sclerenchyma as well as the more delicate tissues, others avoid them. The feeding place, examined against the light, shows that it has been eaten out with great delicacy.

The full-grown larva, which produces the feeding places described, tapers towards each end, is pale greenish or darker yellowish to dirty green, and shows usually two darker sub-dorsal lines not sharply defined and with little warts in the form of dots. Fully grown it reaches a length of 7-8 mm.

While a young miner, the head is in line with the axis of the body, but in the grown larva it is at right angles to this axis. This morphological modification is consequent upon the change in the mode of life of the larva. While feeding in the mine it meets its food in front of it, so that the larva is constrained to eat forwards, but when living in the open the larva finds its food below it.

Not all *Bucculatrix* larvae behave as we have described, leaving the mine and making external feeding patches. *B. noleti*, Petry, *B. artemisiae*, H-S., and *B. absinthii*, Gartn., continue to mine until they are full-grown. It is true that in these cases the mines are not in the form of galleries, but of blotches made by the larva from the exterior. In the case of *B. noleti* the larvae behaves in the following manner. A hole is made in the inferior epidermis and starting from that spot the parenchyma is eaten out to form a more or less round blotch, exactly in the manner of feeding exhibited by the *Coleophoridae*; nevertheless, the larva is compelled to enter the leaf up to about half its length. The larva of *B. artemisiae*, on *Artemisia campestris*, L., and that of *B. absinthii* on *Artemisia absinthium*, L., achieve the same end in another manner. The leaf is cut at the edge, and through this cut the larva eats the parenchyma, only penetrating the leaf to the extent up to half the length of its body, if the size of the cut permits. In consequence the larva is often obliged to change its leaf.

The mode of life of *B. gnaphaliella*, Tr., is again quite different from those I have described. When the larva has left the mine that it occupied in its first stage it eats into the central shoot of its food-plant, *Helichrysum arenarium*, DC., and only leaves it to pupate.

After about a couple of weeks, the *Bucculatrix* larva is ready to pupate. It then seeks a suitable place, near its food-plant, for the attachment of its cocoon, and the artistic construction of this cocoon makes it worthy of a full description.

The species feeding on low plants usually pupate on the plant itself, while those living in the leaves of trees most often place their cocoon on the trunk. In most cases the cocoon is long, narrow, and characterised by some seven to nine ridges along the vaulted back. Dull colours predominate—yellowish-white, brownish and grey. These colours,

characteristic of the various species, are, however, bleached during the course of hibernation by the action of the weather.

The cocoons of two Central European species only are not constructed on the lines which we are about to describe. These are *B. boyerella*, Dup., and *B. gnaphaliella*, Tr. Both these commence by making a flat web under the protection of which they afterwards make the proper cocoon in which to pupate. This true cocoon is not ribbed as are those of the other species.

De Geer has described at length in the first volume of his "Memoires," published in 1752, pages 459 to 469, the history of a small smooth green larva, furnished with sixteen legs, eating into the leaves of *Frangula*. This is the larva of *B. frangulella*, Goeze, the construction of whose cocoon interests us particularly because it agrees in all respects with our own observations. I think I should cite the actual wording of De Geer, taken from the work of H. T. Stainton ("The Natural History of the Tineina," London, 1862, pp. 125/128) assuming that readers could only with great difficulty consult the original of De Geer owing to the rarity of the work.

De Geer first of all describes very fully the larva of *B. frangulella*, Goeze, and continues as follows:—

"I was very happy to observe one of these larvae at the time when it had commenced to work on the construction of its cocoon; I noticed one thing worthy of attention and but little known, namely that while the larva was making the half of its cocoon, it remained outside it the whole time. We know that ordinarily larvae shut themselves inside their cocoon as they work on it so that as the construction of the cocoon proceeds the larva becomes more and more firmly enclosed.

"Our little larva, however, behaves quite differently; it lays, so to speak, the foundation of one end of the cocoon which it proposes to construct. It adds new threads to this little beginning, adds further threads to these others, and so on. As the work progresses the larva continues to work backwards, and its body lies almost in the line of the cocoon under construction, and remains outside it all the time, and only touches with its head and scaly legs (? true legs) the forward edge of the cocoon.

"When the half of the cocoon, or, rather, the outside layer, has been completed, the larva ceases work for some moments. It will be noticed then that it enters head first into this half-cocoon, and comes out again having bent the body in two, and while the body is thus doubled, it is greatly restricted by the cocoon, seeing that the size of the cocoon is scarcely more than would be required to accommodate the natural size of the body. At last the larva manages to turn itself around entirely so that its posterior end is found in the pointed end of the cocoon, or the little end of the cocoon already made, and with the head and the front half of the body outside this half-shell.

"Now it sets to work on completing the other half of the shell, and it spins this new portion in the same manner as it did the first,

and as the work proceeds, it draws backwards with its head, but as it is inside the constructed part, it cannot move backwards bodily, so that it shortens the body more and more. When, however, the new half of the shell has grown so far that the body of the larva cannot allow of any further shortening to permit of the head reaching the edge, it turns the head backwards over the body and is thus again able to reach the edge of the shell with the spinnerets. When the edges have come closer together it is only the head of the larva that can be inserted between the edges, and even this space becomes further reduced so that even the head cannot be inserted without disarranging the tissue of the edges, and the larva is compelled to close this space in another manner. It withdraws the head into the shell and then stretches silken threads lengthways of the cocoon between the two edges, and in this way it has soon joined the edges of the two halves of the cocoon."

The chrysalis possesses on the head a characteristic toothed appendage, and by means of this peculiarity, aided by the bristles to be found on the edge of the segments, it is enabled easily to open the cocoon and force itself outside.

There is no difficulty about finding the larvae of *Bucculatrix*. Full-grown larvae betray their presence clearly by their remarkable manner of feeding and, notwithstanding their smallness, they are easily found. In most cases, it is enough to examine the attacked leaves with the naked eye, and the successful collecting is made easier because larvae always appear in large numbers in fine weather. One can find as many grown larvae feeding in the open as there are young larvae still mining.

In dealing with branches, search with the naked eye is more difficult, and it is advisable to put the beating tray underneath, but it must be borne in mind that not all the larvae fall into the tray. Many remain suspended on threads instead of falling further and thus may escape observation quite easily.

Breeding is best carried out in glass vessels that can be ventilated. The larvae in most cases construct their cocoons either on the glass or fixed to the leaves. Only the larvae of *B. boyerella* fail to find a suitable place for spinning up, but they may be encouraged by putting in the container small pieces of folded paper, when the larvae will spin their cocoons in the folds. These cocoons differ from those of other *Bucculatrix* in that they are flattened and have no ridges.

Larvae collected in the autumn will give imagines in the spring, and it is to be recommended that the breeding glasses should be left for at least three or four weeks exposed to the natural cold since, in the case of most species, the larvae do not pupate until after hibernation and need for this purpose a period of cold to stimulate their development. In my experience *B. noleti*, Petry, is an exception, and the development of the autumn larvae into imagines only requires breeding from October to January.

SOME INTERESTING MICROLEPIDOPTERA

By S. WAKELY.—Read 25th August, 1938.

The title of this paper might cause an entomologist to exclaim: "But all Lepidoptera are interesting!" Personally, I agree with this opinion, but by keeping to insects taken this season I am narrowing the field.

The first insect I have chosen to mention is *Epischnia banksiella*, Richardson. The larvae of this species feed on *Inula crithmoides*, L. (Golden Samphire). Meyrick says: "Dorset (Portland to Purbeck), in salt-marshes." The latter part of this sentence is entirely misleading, as, although *Inula crithmoides* usually grows in salt-marshes, the moth is only found where the plants grow on cliff-sides or cliff-tops. At Swanage, on 7th May, I found the larvae not uncommon, sometimes several on a plant. They live in a tubular web, which runs down from the feeding place to the ground, sometimes extending along the surface of the ground and sometimes penetrating the soil for an inch or more. As the plants grow near the top of the cliffs, getting the larvae is no easy matter, and non-slip shoes are essential. There is little doubt but that the plants grow also in inaccessible places on ledges along the cliffs, so there is little chance of this local insect being over-collected. Larvae were also seen at Portland, the rocky soil here being very similar to that at Swanage. It is a fact that plants are affected by the soil they grow in, and it would be interesting to know if the larvae would thrive on plants grown in soil which does not contain lime. On the marshes the *crithmoides* thrives on clayey soils which are submerged at high tides, but, as I said before, *E. banksiella* does not occur, or so I am told, in such situations. My larvae were mostly parasitised by a large Ichneumon fly, specimens of which are shown.

At Norwood, close to my home, there is an old ash tree growing by the roadside. In the bark of this tree there is a colony of the well-marked Phycitid, *Euzophera pinguis*, Haw. The frass from larvae is very noticeable in the crevices of the bark. In spite of repeated visits to the tree at all hours of the day, I have taken less than half-a-dozen moths on the tree-trunk during two years. However, I have been given a tip that the moths emerge in the evening about nine o'clock and sit about drying their wings for half an hour or so before making their way further up the tree, or hiding away. The moth is attracted to light, and I have taken a small series by this means.

Thanks to Mr Jacobs, who told me where to collect the stems of *Typha latifolia*, L. (Bullrush), I bred a small series of *Crambus paludellus*, Hübn. Except that the larvae can be bred from the *Typha* stems, I can give little information about their habits, but they probably feed in the autumn in the green stems which, as the season advances,

die and go brown in colour. The larvae make long tunnels in the soft stems, often side by side with *Nonagria typhae*, Thunb., eventually pupating in June or July in a silk-lined puparium.

Pyrausta stachydalis, Zinck., bears a striking resemblance to *Phlyctaenia sambucalis*, Schiff., but the foodplants of their larvae are very different—the former, quite a local insect, feeding on *Stachys sylvatica*, L., while the latter is attached to Elder (*Sambucus*). *P. stachydalis* larvae may be found under a few strands of silk on the undersides of the leaves of *Stachys sylvatica*. No silken tubes, as mentioned by some writers, were visible to me. I bred half a dozen moths from larvae taken at Freshwater last August. They are not easy to rear and do not actually pupate till late spring. They are full fed in September, and mine pupated between two pieces of wood bound together and forming a cavity in the centre where the larvae spun up all together. They were kept outdoors, but I think they got a little too dry during the critical period, when they were pupating (or trying to), as the majority died in their cocoons in the larval stage.

At the Field Meeting at Benfleet on 10th July I took a fine specimen of the rare *Pyrausta nubilalis*, Hüb. Thinking it must be a specimen of *Psammotis hyalinalis*, Hüb.—a species I have never taken—I sleeved it on a plant of *Centaurea nigra*, L. A few days later, Mr Huggins, who had suggested when he saw the moth that it was *nubilalis*, wrote that he had taken several more and that they were *nubilalis* without any doubt. My specimen had already oviposited on the *Centaurea*, and I decided to kill it then before it got in a worse condition, but it was already in a sorry state. The known foodplants of *nubilalis* are hop, hemp, and millet, and the larvae are internal feeders. My ova hatched and the larvae apparently burrowed their way into the leaves of the *Centaurea*, causing white spots, but whether they will feed up or perish remains to be seen. It is obvious that a brood emerged at Benfleet, probably from a single female immigrant, but there is no hop near where the moths occurred, and as hemp or millet as a foodplant is most unlikely, the pabulum in this locality is a mystery.*

Pyralis glaucinalis, Linn., occurs in hayricks and thatch, the larvae feeding in silken galleries. Mr Rudland sent me a liberal consignment of the larvae and pupae which were found in a squirrel's drey at Padworth, Berkshire. This is the first time I have heard of this as a habitat for the larvae, and it is of interest that there were over a hundred in one nest. *P. costalis*, Fabr., was also bred from the same squirrel's nest.

An interesting Plume is *Agdistis statices*, Millière. This differs from *A. bennetii*, Curtis, in larval habits, but was originally thought to be only a variety. I brought home a few plants of *Statice auriculaefolia*, Vahl (Sea Lavender) from Portland on 7th May, and was subsequently pleased to see there were two small larvae on the leaves. These pupated and emerged on 26th July. The pupae were much browner than those of *A. bennetii*, the latter usually being green in colour and toning well

with the coloration of the leaves of its foodplant—*Statice limonium*. The *Statice auriculaefolia* has much smaller leaves than *S. limonium* and grows on the cliffs above high-tide mark.

Laspeyresia servillana, Dup., feeds in the larval stage in the shoots of Sallow, and causes a small swelling. This might be mistaken for the work of the larva of *Synanthedon flaviventris*, Stdgr., but the latter is usually larger and in thicker stems. Several *servillana* were bred from stems collected at the Oxshott Field Meeting.

Most people, particularly housewives, are familiar with the larvae of *Laspeyresia nigricana*, Steph., but there must be a number of persons who have never seen the moth. I bred a series this year from garden peas bought at Norwood last autumn.

Pthorimaea suaedella, Rich., occurred at Chesil Beach very commonly in May in the larval stage, feeding on *Suaeda fruticosa*, Forsk. This is very similar to several closely-allied species in the same genus, such as *P. seminella*, Pierce, and *P. plantaginella*, Staint. The former I find commonly among the seeds of *Atriplex* near East Cowes, Isle of Wight. *P. plantaginella* was swarming in the larval stage in the crowns of *Plantago coronopus*, L., at Swanage in May. The attacks of the larvae usually kill the plants, if small. Some of the larger plants were inhabited by several larvae, but I found most of the larvae in the withered plants. Very different in appearance from those just mentioned is *Pthorimaea leucomelanella*, Zeller, the larvae of which feeds in spun shoots of *Silene maritima*, With. It was fairly common at Chesil Beach early in May.

The delicate little *Cosmopteryx eximia*, Haw., occurs at Bexley, Kent, and I am indebted to Mr L. T. Ford for the series shown. They are very active, and were beaten out of their foodplant (hop) into a net, but had to be boxed quickly before they recovered and attempted to fly.

Another local moth which occurs at Bexley is *Chrysoclista atra*, Haw. This dark species kills the apple shoots attacked by the larvae and may be bred from the dead shoots in which they pupate.

A striking little moth is *Stephensia brunnichiella*, Linn., the larvae of which feeds in a blotch (usually at the apex) in the leaves of the Wild Basil (*Calamintha clinopodium*, Spen.). The specimen shown was taken at Coulsdon, Surrey, where larvae were also found. A few weeks ago I saw leaves that had been mined by this species on St George's Down in the Isle of Wight, but was too late to get larvae.

Elachista cinereopunctella, Haw., occurs on *Carex glauca*, Scop., at Riddlesdown, Surrey. It is a local insect, and those shown were bred from pupae found low down on the foodplant. The pupae are exposed and fastened to the plant by the tail end.

Another local insect is *Zelleria hepariella*, Staint., and those members who were present at the Boxhill Field Meeting will doubtless remember seeing this larva when beating the ash trees. The best way to take it, however, is to look for the webbed leaves, usually those at the top of the

small trees 8 or 10 feet high. This insect loses the beautiful rich red colour if killed with ammonia, and luckily I had been warned of this in time.

One of the largest and most striking of the *Coleophoridae* is *Coleophora vibicella*, Hübn., the larva of which, in its large shiny black case, feeds on *Genista tinctoria*, L. It is not uncommon in the north-west of the Isle of Wight (Gurnard, Newtown, etc.). The larval case is not unlike the ripe pods of the *Genista*.

A species of interest to gardeners (though not quite in the same way as to entomologists) is *Gracillaria azaleella*, Brants., which is often quite common on greenhouse Azaleas. Those shown came from Bournemouth, where Mr S. Brown finds them a pest among the outdoor Azaleas.

The large *Cerostoma caudella*, Linn., were bred from ova obtained from hibernated females captured by Mr Rudland in Oxfordshire. The larvae are difficult to find, and the moths are seldom seen except as odd specimens. The foodplant is the Spindle (*Euonymus europaeus*, L.), and they were easy to rear.

Certainly one of the most outstanding insects I took during the season was *Meesia richardsoni*, Walsingham, the larvae of which were found under rocks at Portland. The larvae feed in cases which are covered with grains of the rocks on which they occur, being difficult to see. The cases evidently remain attached to the underside of the rocks for some years after the moths have emerged, being sheltered from the weather, and this means that a number of the cases collected are old ones. Under the circumstances I was very pleased to breed a short series of the striking-looking little moth.

The last two species to be mentioned in this paper are *Nemotois fasciella*, Fabr., and *N. scabiosella*, Scop. The former were taken as larvae in their peculiar cases at the base of plants of *Ballota nigra*, L., near Dartford, Kent. The latter came from Coulsdon, Surrey, where they were not uncommon on the flower-heads of *Scabiosa arvensis*, L., at the end of July. Unfortunately, the ground where these came from is being built on, and it is to be hoped it occurs in other spots in the neighbourhood. Personally, I think that *Nemotois fasciella* is the most brilliantly coloured of any of our British Lepidoptera, and it is certainly a beautiful insect.

I have endeavoured to show specimens of all the insects named in this paper, together with larval cases in some instances. Many of the insects named I should not have obtained had it not been for help from friends, and I should like to close by expressing my thanks to them for their kindness and generosity.

[Since these notes were written, it has been found that the larvae of *P. nubilalis* may be found feeding internally in stems of *Artemisia vulgaris*.—S. W.]

**RECENT DISCOVERIES IN THE BIOLOGICAL RELATION OF
THE TWIN SPECIES CHLORIDEA (HELIOTHIS) MARITIMA AND
C. (H.) DIPSACEA.**

By HY. J. TURNER, F.R.E.S., F.R.H.S.—Read 8th September 1938.

(Plates VIII, IX, X.)

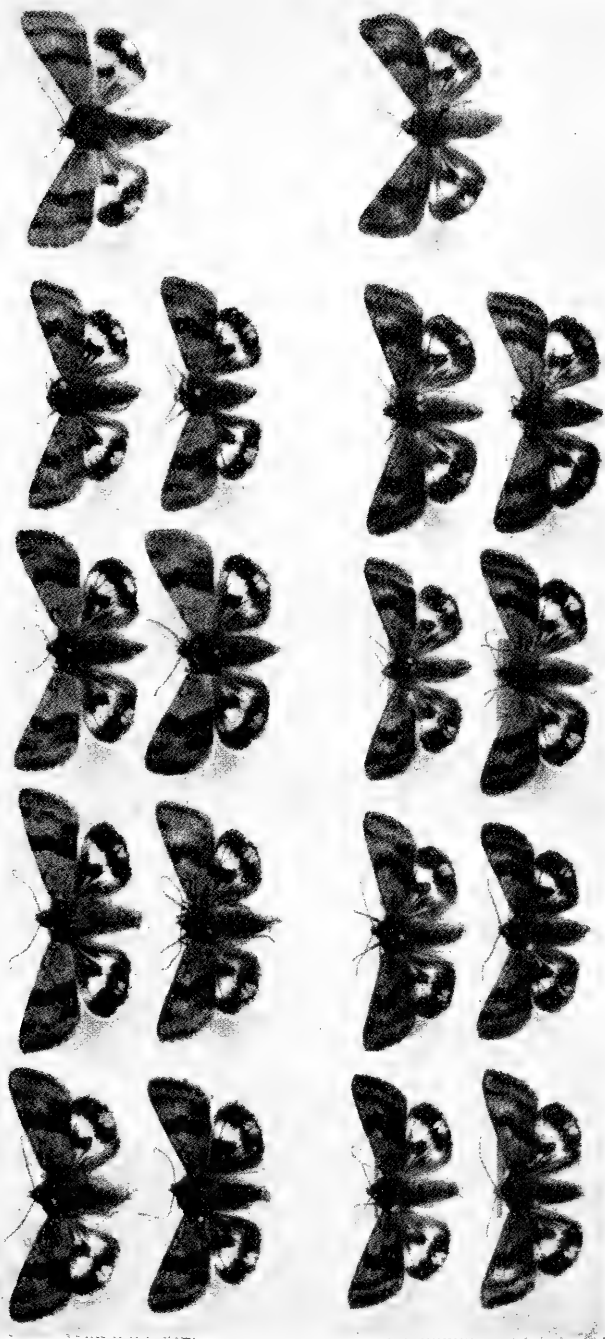
Early in the present year (1938) English Lepidopterists were somewhat perturbed to learn that the two figures in South's "Moths of the British Isles," Vol. II, plate 19, labelled *Heliothis dipsacea*, L., were not that species, but were really figures of the closely allied *H. maritima*, Gras. In 1855 Graslin, an eminent French lepidopterist, had described and figured in the "Annales Soc. ent. France," this latter species from the western coastal area of France. Although Graslin supported his contention by very strong evidence, *maritima* had been treated often as merely a form of the widespread *dipsacea*, which it so closely resembled.

In the February number of "Flora and Fauna," a Danish periodical, Skat Hoffmeyer, a keen Danish entomologist, a correspondent of the late C. R. N. Burrows and of myself, contributed an article, in which he clearly showed that there were two quite distinct species separable by their facies and structure and by their biologic behaviour. He noted that

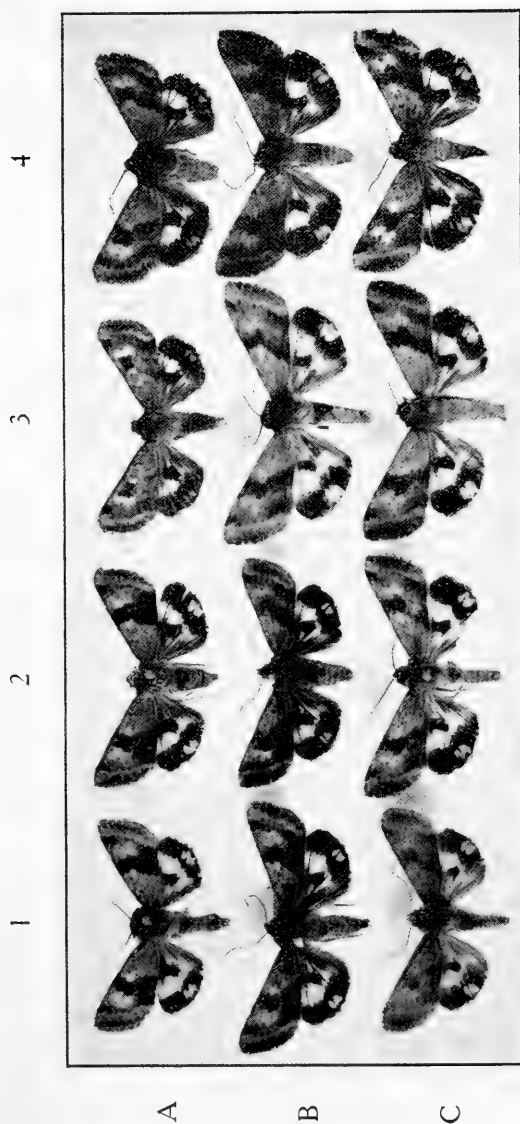
H. dipsacea had the central shade, or band, mostly quite definite, more uniformly coloured, and met the inner margin at right angles, and that structurally the uncus had only one curve and was straight in the lower half.

H. maritima had slightly narrower wings thus rendering the apex more acute and the outer margin more oblique; the central shade was very oblique to the inner margin; quite differently coloured and marked, often with short black shades in the costal portions of the wings; and that structurally the uncus was bent both sides, S-shaped in section.

The distribution of these two in Denmark is—*dipsacea*, well distributed: Bornholm, Seeland, Lolland, Funen and all parts of Jutland; *maritima*, confined to Jutland, both East and West Jutland, but few in Central Jutland. Hoffmeyer's correspondents informed him of examples of *maritima* from N.W. Germany (W. Schleswig, Rensburg, etc.), and from Holland, where Lempke reports that "*dipsacea* is well distributed on the dunes, but very few occur on heathy areas, while *maritima* does not occur on the dunes but on heathy areas probably everywhere." Finally, Hoffmeyer communicated with Mr W. H. T. Tams of the British Museum for his opinion. The latter confirms the occurrence of the two species in England—" *dipsacea* commonest in the Eastern Counties," "*maritima* in the South (New Forest, etc.);" also that "the figures in South and Pierce are certainly *maritima*; and that he does not find any difference between the genitalia ♂ and ♀ of the original Graslin material and British material." [Graslin's collection was included in the Oberthur material purchased by the Trustees.]



Figs. : 1-9, *C. dipisarea*, L.; 10-18, *C. maritima*, Grsl.



A : 1, *C. dipsacea*, L.; 2, *C. dipsacea* L.; 3, *C. dipsacea*, L. ssp. *canariensis*, Warr.; 4, *C. dipsacea*, L. ssp. *canariensis*, Warr., ♀.
 B : 1, *C. maritima*, Grsl. ssp. *septentrionalis*, Hfm.; 2, *C. maritima*, Grsl. ssp. *septentrionalis*, Hfm., ♀; 3, *C. maritima*, Grsl. ssp. *bulgarica*, Drdt.; 4, *C. maritima*, Grsl. ssp. *bulgarica*, Drdt., ♀.
 C : 1, *C. maritima*, Grsl. ssp. *centralasiacae*, Drdt.; 2, *C. maritima*, Grsl. ssp. *angarensis*, Drdt.; 3, *C. maritima*, Grsl. ssp. *angarensis*, Drdt.; 4, *C. maritima*, Grsl. ssp. *angarensis*, Drdt.

Hoffmeyer gave the dates of his captures which tend to show that there are two generations of *dipsacea*—I, from the fourth week in May to the end of June; II, from the end of July to the third week in August (with an odd capture on 10th September). *maritima*, from the second week in June until the second week in September.

Hoffmeyer's keen interest led him to compare the *maritima* he had taken in Denmark with the *maritima* from the West of France and described by Graslin. He soon found that, although they were identical in structure, his northern specimens showed sufficient differentiation of characters to suggest a local form. The Danish *maritima* had quite evident black scaling, particularly oblique position of the central shade, considerable contrast in colour, and the apparently complete inability to produce the red forms so characteristic of the typical *maritima*, Gras., of Western France. And this form he named *septentrionalis* (n. f.).

Further, Hoffmeyer went on to suggest that this newly-observed form was the phylogenetic original, on account of its less restricted habitat (not confined to salt marsh areas), its restricted variability, and in support of this view instances the biologic fact that typical *maritima* was definitely attached to areas of a saline nature, whereas *septentrionalis* in Jutland, on the contrary, flew over dry heaths, heath-moors and dunes, none of which was saline.

Doubtless it was an article on *H. maritima* by M. Durand, of Paris, in the Belgian paper, "Lambillionnea," which suggested to Hoffmeyer that he should publish the notes and observations he had for some time been accumulating.

The information given by Durand was very useful and a few items from his article may interest us.

He points out that Berce stated ("Fn. ent. France, Lép.," IV, 1870) that *maritima* came from the "Coast of La Vendée," and that Gelin and Lucas ("Cat. Lép. d'ouest France," 1921) stated that it occurred "on the dunes of the shore." And he goes on to say that Graslin in his communication of 1863 ("Ann. Soc. ent. Fr.") definitely says salt marshes ("marais salants"). At the same time he (Durand) notes the curious fact that Graslin said "littoral de la orientale" probably a *lapsus calami*, or a printer's error for "occidentale."

It was unfortunate that the preparations he figured of the genital structures were imperfect and confusedly misleading.

Durand remarks of the Biology of the two species that both fly by day in fine weather in the hot sun. *Dipsacea* is met with in dry places and delights to pilfer among thistles and in fields of lucerne and trifolium, and is particularly heliotropic; while (typical) *maritima* is always found in salt marshes and among halophilic vegetation of saline slime and mud. Both species can be found at night, flying or in còp. If a light suitably situated be turned to the salt marsh area only *maritima* will be attracted, but when turned to the neighbouring dunes or cultivated areas only *dipsacea* will appear.

In the November-December number of "L'Am. de Pap." M. Boursin of Paris, well known for his studies on the Noctuae, pointed out the defects of the figures given in Durand's paper. It had been stated that the "gnathos" in *maritima* was pointed, but Boursin said that this structure does not exist in the group to which these species belong, and that what was seen in the preparation of Durand was simply the anus tube, and in fact the two figures presented no recognisable difference in this respect. Boursin went on to note that the vesica was not to be seen in either of the figures in Durand's paper and refers to his own examination, which showed that at the extremity of the vesica in *maritima* there is a strongly chitinized, elongate plate, a feature which does not exist in *dipsacea*.

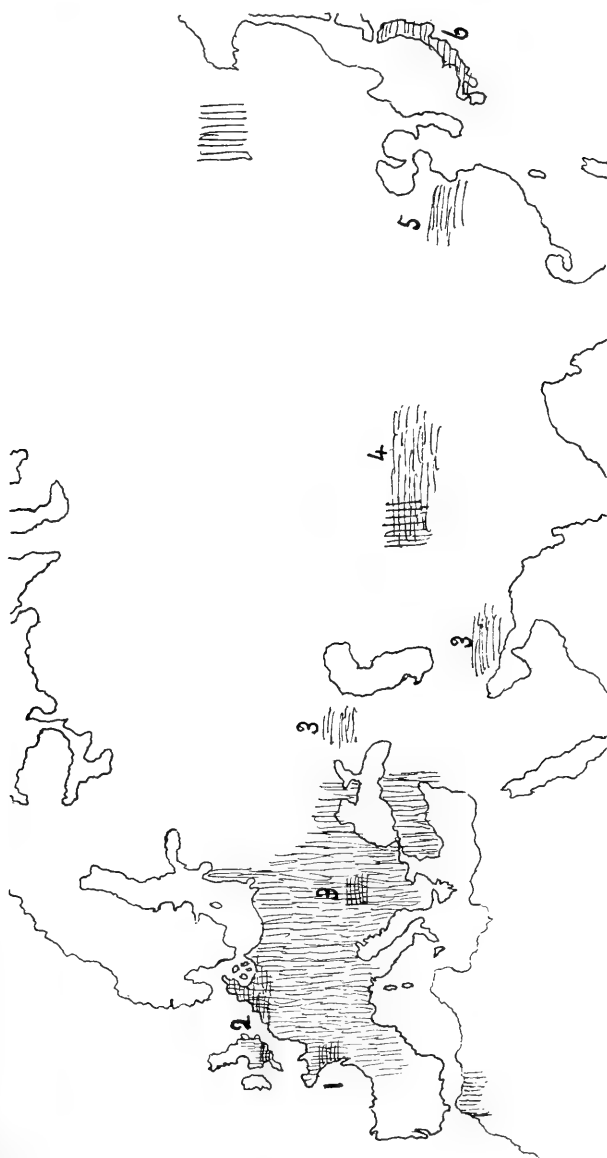
Perhaps, here I may make a digression to point out a curious error which occurs in Tutt's "British Noctuae," Vol. III, in dealing with the differentiation of *maritima* from *dipsacea*. He quotes Graslin (in translation) to say that *maritima* has the band "less wavy and turns in a striking manner away from the body on approaching the inner margin." The actual phrase of Graslin was, "s'avance d'une manière notable du côté du corps." Possibly Tutt had no example of *maritima* before him to check his statement or he must have seen the error.

We now turn to the information collected by Herr Draudt, who has succeeded the late Dr Corti in the preparation of the matter for the supplementary volume on the Palaearctic Noctuae in Seitz's works, and we will summarise his memoir on the distribution and variation of these two species. ("Ent. Rund.," 15th April 1938) ("Am. de Pap.," May 1938, translated into French).

Subsp. *septentrionalis*, Hffmyr.—Draudt pointed out that, in addition to the before mentioned characters, this form has a dark shade at the base of the forewing just below the median vein, a feature not possessed by *dipsacea* nor by any other form of *maritima*. Members who have seen British caught *maritima* will at once recall this character.

Subsp. *adaucta*, Butler.—This was described as a species from Japan and characterised by its large size and more fulvous colour, the under-side of both wings yellow, with outer margin towards the apex fulvous, and all black markings enlarged and intensified (Warren in "Seitz Pal. Noct.," III, p. 345). In the figures both sexes are shown with pinkish white ground for the hindwings, to which there is no reference in the text, nor does Draudt mention it. It may be called to mind that Hoffmeyer stresses its absence in *septentrionalis*.

Subsp. *bulgarica*, Drdt.—A small series from Bulgaria contained both typical *dipsacea* and a form of *maritima* much larger, very oblique median band of a warm colour of greenish-olive-yellow to olive-green, with the ground of both wings white and without a longitudinal basal shade. Although it approached the *adaucta* of Japan in some characteristics this form was sufficiently distinctive and Draudt named it *bulgarica*.



DISTRIBUTION OF *C. DIPSACEA* AND *C. MARITIMA* SO FAR AS ASCERTAINED.

||| *dipsacea*.

== *maritima*.

1, *maritima*; 2, *septentrionalis*; 3, *bulgarica*; 4, *centralasiatica*; 5, *angarensis*; 6, *adactyla*.

del. Hy. J. T.

Subsp. *centralasiae*, Drdt.—A few specimens coming from Central Asia (Ili, Aksu, etc.) were of another type—small, dull clay yellowish insects evidently a *maritima* form, to all appearances adapted to desert conditions, and this form Draudt named *centralasiae*.

[ab. *albida*, Fuchs.—This was described many years ago as having whitish forewings, with very feeble median band, the hindwings with a pure white band and a large white spot. The locality was not recorded. Probably it was near the Lorelei in the middle Rhine area where Fuchs lived and collected, and would certainly not be a *maritima* form, as only *dipsacea* occurs in that area. In the absence of positive information this record can be ignored. The insect may even have come up the Rhine with merchandise and be a *maritima*.]

ab. *albida*, Warren.—Warren in Seitz gave the name *albida* to an example, which answered fairly well to the description of Fuchs, from the Southern Urals. This may have been either a *dipsacea* or a *maritima* ssp. *bulgarica* form. Personally I suspect it was a *maritima* as, only last week, I obtained from an old collection three specimens of that species taken in the Crimea, in which the ground colour was more extensively white. Obviously the name *albida*, as there were two distinct species, could be used for an aberration of both if necessary.

Subsp. *angarensis*, Drdt.—A series of examples collected by Hone in China (Shantung, Tapai-shan, etc.) were at first considered by Draudt as agreeing with the *albida*, Fuchs, but this view he subsequently admitted to be an error on more intimate knowledge of them.

This Chinese form tends to resemble both the Japanese *adaucta* and the Bulgarian form. While the latter is almost without marking below and has only a slight trace of the yellow-red tint, the Chinese examples have large bands below of deep black with an intense yellow-red clouding. To this Chinese form Draudt gave the name *angarensis*, because he considered it to be the phylogenetic origin of the species, and refers to the conception of *Caradja that the area of origin of most of the Eurasian species is the old continent of Angara in the actual formation of China, whence species have spread in radiate directions towards Europe as have the various peoples of Europe in ages ago.

ab. *ferruginea*, Spuler.—This is the very red-fulvous form of *maritima* from the West of France so well figured in Culot's book. The hindwings are of a deeper yellow.

The *dipsacea* forms are:—

ab. *tristis*, Strnd.—A dark greenish-grey form of *dipsacea* with increased black on the hindwings.

ab. *salmatina*, Fdz.—Somewhat resembles *adaucta* but is a *dipsacea* with a slightly reddish hue and smaller, the hindwings not yellowish and the central spot not joined to the marginal band but isolated. Salamanca, Spain.

ab. *canariensis*, War.—This form of *dipsacea* from the Canary Islands has somewhat red forewings and yellowish-white hindwings.

*The keen student, and author of many publications on the fauna of China.

Maritima and *dipsacea* fly together in Jutland (Denmark), Holland, England (?), N.W. Germany, in Bulgaria on the Danubian slopes and in the somewhat desert-like areas north of the Himalayan Mountains. But the distribution of the two species is by no means known as the evidences are so extremely fragmentary.

Lederer, for nomenclatorial reasons, suggested the substitution of the name *spergulariae* in place of *maritima*. *Spergularia* is the food plant of the typical *maritima* in West France. But no one adopted it as being valid.

Tutt in his "British Noctuae," Vol. III (1892), at the instance of Grote, included two American species, viz., *interjacens*, Grote and *luteitinctus*, Grote, as forms of *dipsacea*, but these can be dismissed since Smith examined the type material in the British Museum and found that these two were quite distinct from the European. ("Cat. Noct.," 270, 1893.)

I leave the consideration of twin and multiple species for further study.

Mr B. A. Cooper reports a specimen of *C. maritima* taken at light at Wareham, Dorset, 17.vii.37. Four *Chloridea* (*Heliothis*) bred this year from larvae in the seed heads of bladder campion collected at Barton Mills, Suffolk, last year emerged at the end of June and were *dipsacea*. At the end of June this year imagines were flying in the sun over the same ground, all *dipsacea*.

Mr A. M. Morley of Folkestone notes as to the *Chloridea* (*Heliothis*) collected by him:—2 *dipsacea* from Suffolk, 3.vi.32 and 6.vii.32; and 1 near Lake Geneva, 23.vi.37. 1 *maritima* from Bagshot Heath, 14.vii.37; 2 on heather at Wareham, Dorset, 13.vii.37; 3 taken on heather in the New Forest, 14.vii.37. All these *maritima* were the subsp. *septentrionalis*, Hffmyr. Mr Morley notes (1) all the *dipsacea* were taken over clover with no heather, all the *maritima* were taken over heath. (2) That *dipsacea* occurs in late June or early July, *maritima* nearer to the middle of July.

Mr Austin Richardson of Minchinhampton, Glos., reports 7 *maritima* from Wareham, Dorset, and 1 *dipsacea* near Brandon, Suffolk.

Dr K. G. Blair records 2 *C. dipsacea* at flowers of *Echium vulgare*, at Tuddenham near Mildenhall, early June 1901, in strong sunshine, ground sandy, with scanty vegetation—no heath.

We are much indebted to the kindness of Skat Hoffmeyer, of Aarhus, Denmark, for permission to copy plate VIII (F. & F.) and to M. Leon Lhomme for his permission to copy plate IX (Rev. Fr. Lepid.).

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CORRECTIONS in last year's (1937-8) *Proceedings*.

- p. 28: lines 6-5 from the bottom, transfer "and aberrant forms of" to
line 2 from the bottom before "*Spilosoma*."
p. 5: line 15 from the bottom, "*gothicina*" should be "*obsoleta*."
p. 20: line 13 from the bottom, "*insulana*" should be "*insularia*."
p. 22: line 11 from the top, the specimen should have been named. It
was ab. *edelsteni*, Tams.
p. 25: line 16 from bottom, should have been "*hazeleighensis*" and not
as spelled.
p. 24: line 18 from top, read "*Metcalf*" and not "*Metcalf*."

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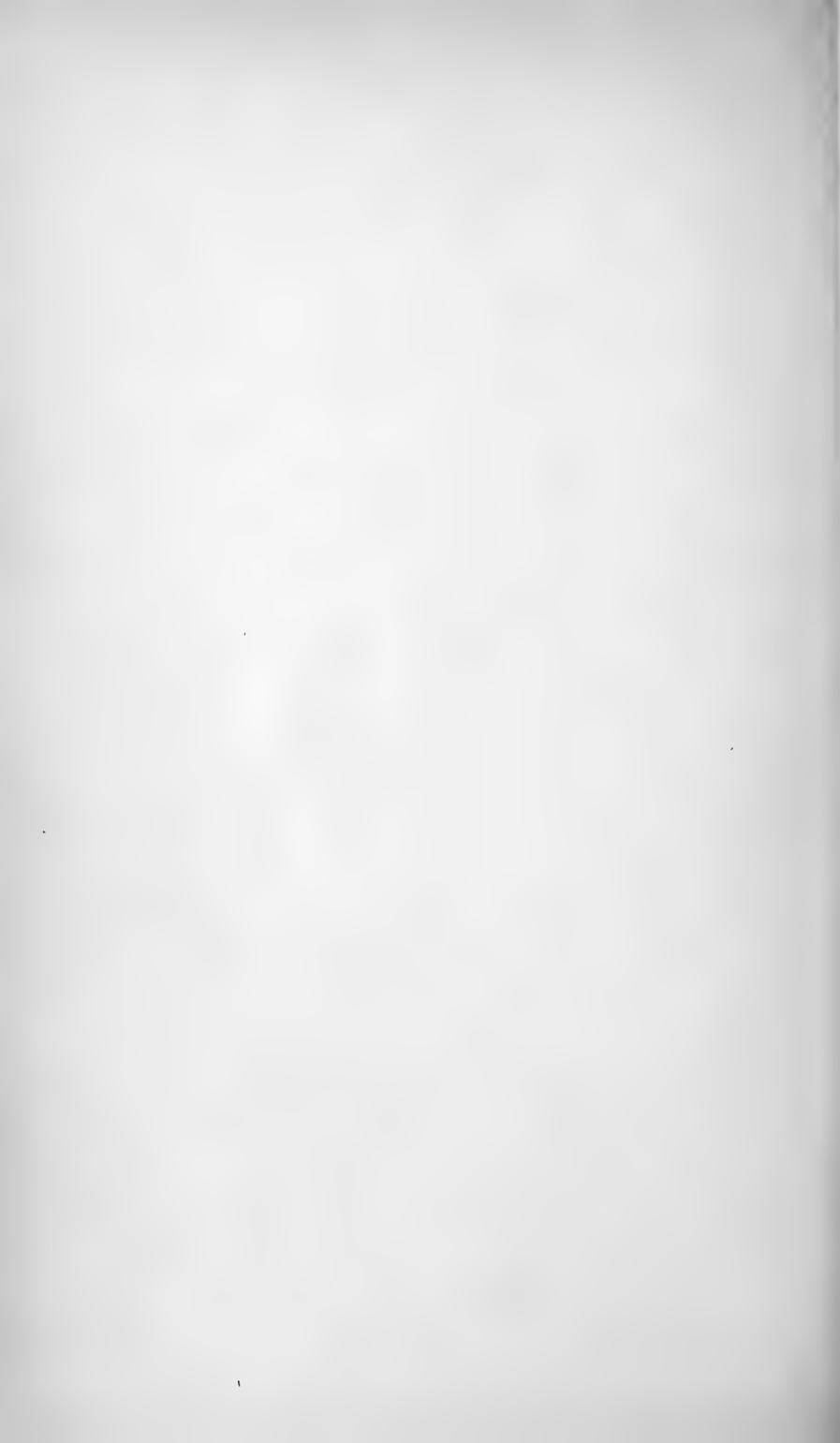
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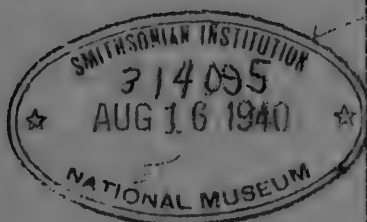
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Proceedings and Transactions
OF
THE SOUTH LONDON
Entomological and Natural History Society

1939-40

WITH SIX PLATES

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THE CHAPTER HOUSE, ST THOMAS' STREET, SOUTHWARK, S.E.1.

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THE SOUTH LONDON Entomological and Natural History Society

THE CHAPTER HOUSE, ST THOMAS' STREET, SOUTHWARK. S.E.1.

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 1886 ADKIN, B. W., F.R.E.S., "Highfield," Pembury, Tunbridge Wells.
l, orn.
 1922 ADKIN, J. H., *Hon. Lanternist*, "Lamorran," Oak Lane, Seven-oaks. *l*.
 1928 ANDERSON, C. D., 22, Mount Park Road, Ealing, W.5.
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 1931 ATTWOOD, R. W., 36, Tannsfeld Road, Sydenham, S.E.26. *l*.
 1936 AUGUST, V. E., 59, Hillcross Avenue, Morden, Surrey. *ent*.
 1939 BAKER, D. B., 21, Quarry Park Road, Cheam, Surrey. *l, c*.
 1937 BALLINGER, D. E., "The Cottage," Canham Road, Acton, W.3. *l*.
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 1887 BARREN, H. E., 78, Lyndhurst Road, Peckham, S.E.15. *l*.
 1933 BAYNES, Capt. E. S. A., F.R.E.S., "Monkshatch Cottage," Comp-ton, near Guildford. *l*.
 1927 BEDWELL, E. C., F.R.E.S., 54, Brighton Road, Coulsdon, Surrey.
c, hem.
 1938 BEIRNE, B. P., 4, Toberner Terrace, Monkstown, Co. Dublin, Eire.
micro-l.
 1929 BELL, J. H., F.R.E.S., Dudswell Rise, Northchurch, Berkhamstead, Herts.
 1911 BLAIR, K. G., D.SC., F.R.E.S., 11, Durrington Park Road, Wimbledon, S.W.20. *n, c*.
 1926 BLISS, A., 4, Monahan Avenue, Purley. *l*.
 1925 BLYTH, S. F. P., "Cleeveland," Chislehurst, Kent. *l*.
 1934 BORRER, C. D., "The Old Manor House," Cley-next-Sea, Norfolk.
 1939 BOWES, A. J. L., 15, Queen's Gardens, Herne Bay, Kent. *l*.
 1935 BOWLES, T. J.
 1933 BRETT, G. A., B.SC., A.R.C.S., D.I.C., 2, Old Claygate Lane, Hinch-ley Wood, Esher, Surrey. *ent*.

YEAR OF
ELECTION.

- 1935 BRETT, Mrs S. L. F., 2 Old Claygate Lane, Hinchley Wood, Esher, Surrey. *biology*.
- 1936 BRIEGEL, R. H., 141, Burnt Oak Lane, Sidcup, Kent.
- 1909 BRIGHT, P. M., F.R.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l*.
- 1930 BROOKE, Miss W. M. A., c/o Dr Brooke, 99, The Avenue, Muswell Hill, N.10. *ec. ent, b, marine life*.
- 1939 BROWN, A. G., L.D.S., R.C.S.ENG., 17, The Vale, Golders Green, N.W.11. *l*.
- 1936 BROWN, MAXWELL, West Kent Hotel, Bickley, Kent. *ent*.
- 1938 BROWN, S. H., L.D.S., R.C.S.ENG., 194, Golders Green Road, N.W.11. *l*.
- 1936 BUCK, F. D., *Council*, 49, Elthorne Road, Holloway Road, N.19. *c*.
- 1938 BUCKLEY, W., F.R.E.S., M.I.GAS E., 5, Westfield Road, Cheadle Hulme, Cheshire. *l*.
- 1909 BUCKSTONE, A. A. W., 90, Pams Way, Kingston Road, Ewell. *l*.
- 1927 BULL, G. V., B.A., M.B., *Council*, "White Gables," Sandhurst, Kent. *l*.
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- 1938 BURTON, Miss MARGARET, "Newlands," 212, Golders Green Road, N.W.11. *biology*.
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- 1937 CARDEW, Col. P. A., 21A, Thornton Hill, Wimbledon, S.W.19. *l*.
- 1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs. *l, n*.
- 1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate.
- 1936 CHARTRES, S. A., 9, King's Drive, Eastbourne, Sussex. *ent*.
- 1922 CHEESEMAN, C. J., 100, Dallinger Road, S.E.12. *l*.
- 1936 CLASSEY, E. W., 141, Portnall Road, Maida Hill, W.9. *ent*.
- 1915 COCKAYNE, E. A., D.M., F.R.C.P., F.R.E.S., *President*, "Tindal House," Aylesbury, Bucks. *l*.
- 1934 COLE, G. A., M.A., A.C.A., Ministry of Pensions, Howard Buildings, Howard Street, Belfast.
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- 1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E.18. *l, c.*
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- 1937 CRABTREE, B. H., "Highfield," Alderley Edge, Cheshire. *l.*
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- 1934 CRASKE, J. C. B., F.R.E.S., 194, Cromwell Road, S.W.5. *l.*
- 1937 CRASKE, R. M., 12A, Lower Belgrave Street, S.W.1. *ent.*
- 1918 CRAFTURD, CLIFFORD, "Denny," Bishops Stortford. *l.*
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, Northwich, Cheshire. *l.*
- 1920 CROCKER, Capt. W., 55, Townley Road, Bexley Heath, Kent. *l.*
- 1932 CROW, P. N., "Heathcote," Bigfrith, Cookham Dean, Berkshire. *l.*
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- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l, c.*
- 1937 DEAL, JAMES, 18, Manor Road, West Wickham, Kent. *l.*
- 1933 DEMUTH, R. P., 7, Holland Park Avenue, W.11. *l.*
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*
- 1930 DENVIL, H. G., *Hon. Minuting Secretary*, 4, Warwick Road, Coulsdon, Surrey. *l, c.*
- 1901 DODS, A. W., 35, The Mall, Southgate, N.14. *l.*
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading. *l.*
- 1939 DOUBLEDAY, B. S., F.R.E.S., Monk's Risborough, Aylesbury, Bucks. *chalcidoidea.*
- 1936 DOUDNEY, S. P., "Thurne," 110, Foxley Lane, Purley, Surrey. *l.*
- 1938 DOWN, C., 7, Mersham Drive, Kingsbury, N.W.9. *ent.*
- 1930 DOWNES, J. A., B.Sc., *Council*, Imperial College of Science and Technology, Biological Field Station, Slough, Bucks. *ent, l.*
- 1930 DUDBRIDGE, B. J., B.A., Colonial Administrative Service, Tanganyika, c/o The Secretariat, Dar-es-Salaam; and 13, Church Lane, Merton Park, London, S.W.19. *ent.*
- 1927 EAGLES, T. R., *Hon. Treasurer*, 32, Abbey Road, Enfield, Middlesex. *l, c.*
- 1937 EASTON, N. T., 214, Worcester Road, Droitwich Spa, Worcestershire. *l.*
- 1933 ELGOOD, W. S., North Bank, Wisbech, Cambs.

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- 1923 ELLIS, H. WILLOUGHBY, F.R.E.S., F.Z.S., M.B.O.U., Friary Hill, Weybridge, Surrey. *c, orn.*
- 1937 EMBRY, B., F.R.E.S., 23, Mill Drove, Uckfield, Sussex. *l.*
- 1932 ENNIS, L. H., 16, Ernle Road, Wimbledon, S.W.20. *l.*
- 1935 ENSOR, G. A., "Oakleigh," Knole Road, Dorking, Surrey.
- 1920 FARMER, J. B., 156, Loughborough Park, Brixton, S.W.9. *l.*
- 1924 FASSNIDGE, WM., M.A., F.R.E.S., "Glenbow," 127, Longfleet Road, Poole, Dorset. *l, n, hem.*
- 1930 FERRIER, W. J., 86, Portnalls Road, Coulsdon, Surrey. *l.*
- 1936 FINNIGAN, W. J., 6, Shrublands Grove, Worcester Park, Surrey. *ent.*
- 1887 FLETCHER, W. H. B., M.A., F.R.E.S., Aldwick Manor, Bognor Regis, Sussex. (*Life Member.*) *l.*
- 1926 FLETCHER, P. BAINBRIGGE, M.SC., A.I.C., F.R.E.S., "Winscombe," Copsem Drive, Esher, Surrey. *c, l.*
- 1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*
- 1920 FORD, L. T., "St Michael's," Park Hill, Bexley, Kent. *l.*
- 1939 FORSTER, H. W., 76, Station Road, Chingford, E.4. *c.*
- 1915 FOSTER, T. B., "Downlands," 24, York Road, Selsdon, Surrey. *l.*
- 1907 FOUNTAINE, MISS M. E., F.R.E.S., "The Studio," 100A, Fellows Road, Hampstead, N.W.3. *l.*
- 1933 FRASER, ANGUS, "Ranelagh," Gloucester Rd., Tankerton, Kent. *c.*
- 1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., "Heavers," Ryarsh, Kent. *l.*
- 1912 FROHAWK, F. W., F.R.E.S., M.B.O.U., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*
- 1930 GILLIATT, F. T., F.R.E.S., 25, Manor Road, Folkestone, Kent. *l.*
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l.*
- 1936 GOODBAN, B. S., F.R.E.S., "The Vines," Village Way, Little Chalfont, Bucks. *l.*
- 1936 GOODE, FRANK, 275, Eastern Avenue, Ilford, Essex. *l.*
- 1935 GOODLIFFE, F. D., Lord Wandsworth Agricultural College, Long Sutton, Basingstoke. *ec. ent.*
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- 1924 GRANT, F. T., *Council*, 37, Old Road West, Gravesend. *l, c.*
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- 1933 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe, Croydon.
- 1934 GUNTON, Major H. C., M.B., F.R.E.S., "Rathgar," Gerrards Cross, Bucks. *l.*

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- 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfields Road, Oxford. *l*.
- 1903 HARE, E. J., F.R.E.S., 41, Avenue Gardens, Acton, W.3. *l*.
- 1926 HARMSWORTH, Sir HILDERBRAND A. B., F.R.E.S., 19, Princes Gate Court, S.W.7.
- 1937 HARRIS, H. G., M.D., B.SC. (DURHAM), 5, Archer's Road, Southampton. *l*.
- 1936 HARRIS, W. H. A., 48, Corringway, W.5. *l*.
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road, Winton, Bournemouth. *l*.
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- 1924 HAWKINS, C. N., F.R.E.S., 23, Wilton Crescent, Wimbledon, S.W.19. *l*.
- 1929 HAWLEY, Lt.-Col. W. G. B., D.S.O., "Amber Cottage," Bodenhams, near Salisbury, Wilts.
- 1938 HAYNES, R. F., "The Sanctuary," Burney Road, West Humble, Dorking, Surrey. *l*.
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental Agricola, Casilla Correo 71, Tucuman, Argentina. *l, orn, c*.
- 1937 HAYWARD, L. W., "Westoe," 31, Bower Mount Road, Maidstone, Kent. *ent*.
- 1936 HEDGES, A. V., F.R.E.S., "Milton Ernest House," Milton Ernest, Beds. *l*.
- 1920 HEMMING, Capt. A. F., C.M.G., C.B.E., F.Z.S., F.R.E.S., 18, Glebe Place, Chelsea, S.W.3. *l*.
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c*.
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- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea. *l, ent*.
- 1929 HUGHES, A. W., "Delamere," Buckingham Way, Wallington. *l*.
- 1939 HULLS, L. G., F.C.S., F.R.M.S., F.R.E.S., "Rax," Chidham, near Chichester, Sussex. *ent*.
- 1938 HUMPHREYS, J. A., White Cross Service Station, Sutton By Pass, Sutton, Surrey. *l*.
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l*.
- 1928 JACKSON, F. W. J., "The Pines," Ashted, Surrey.

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- 1940 JACKSON, Capt. REGINALD A., R.N., "The Hermitage," Bishops Waltham, Hants, and The Senior United Service Club, S.W.1. *ent*, *l*.
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- 1924 JAMES, R., F.R.E.S., 14, Golden Lane, E.C.1. *l*.
- 1936 JAMES, W. H., 41, Carson Road, Dulwich, S.E.21. *l*.
- 1927 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent*.
- 1925 JARVIS, C. McK., 68, Clyfford Road, West End Road, Ruislip, Middlesex. *c*.
- 1938 JARVIS, F. V. L., B.Sc., 21, Shirley Avenue, Sutton, Surrey.
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea. *l*.
- 1928 KETTLEWELL, Dr H. B. D., "Homefield," The Common, Cranleigh, Surrey. *l*.
- 1910 KIDNER, A. R., "Starfell," Southdown Road, Seaford, Sussex. *l*.
- 1925 KIMMINS, D. E., 3, Avington Grove, Penge, S.E.20. *l*.
- 1933 KING, H., D.Sc., F.R.S., "Gavarnie," Wise Lane, Mill Hill, N.W.7. *l*, *orn*.
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, S.W.3.
- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l*.
- 1922 LEECHMAN, CAREY B., "Pansala," Roundabouts, Pulborough, Sussex. *l*.
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l*.
- 1934 LINE, H. V., 11, Priory Avenue, Petts Wood, Orpington, Kent.
- 1933 LIPSCOMB, Capt. C. G., Misterton, Somerset.
- 1938 LISNEY, A. A., M.A., M.B., F.R.E.S., The Red House, Harborough, Leicester. *l*.
- 1936 LOWE, Major J. H. B., c/o Lloyds Bank Ltd., Cox's & King's Branch, 6 Pall Mall, S.W.1. *l*.
- 1931 MACNULTY, B. J., "Rutland," 67 All Saints Road, Sutton, Surrey. *l*.
- 1892 MAIN, H., B.Sc., F.R.E.S., F.Z.S., The Summer House, 65, Prior Park Road, Bath, Somerset. *l*, *nat. phot*, *c*.
- 1889 MANSBRIDGE, W., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool. *l*, *c*, *etc*.
- 1932 MARCON, Rev. J. N., Christ Church Vicarage, Seaside Road, Eastbourne. *l*.
- 1930 MARSH, D. G., "Brackla," 31, The Crossways, Sutton, Surrey. *l*.
- 1922 MASSEE, A. M., D.Sc., F.R.E.S., East Malling Research Station, Kent. *l*.
- 1932 MELLOWS, W. T., M.B.E., LL.B., "The Vineyard," Minster Precincts, Peterborough, Northants. *l*.
- 1938 MINNION, W. E., 57, Lloyd Court, Pinner, Middlesex. *l*.

YEAR OF
ELECTION.

- 1889 MOORE, H., F.R.E.S., 9 Hoopwick Street, Deptford, S.E.8. *l, hem, d, e l, e hym, e d, mi.*
- 1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone.
- 1920 MORISON, G. D., B.Sc., Ph.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen. *ec. ent.*
- 1937 MORTIMER, D. A., Comberton Hotel, 13 Station Hill, Kidderminster, Worcs. *hym.*
- 1937 MOWBRAY, M. J., 80, Woodlands Avenue, Wanstead, E.11. *ent.*
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey.
- 1934 MUSGRAVE, A. J., 21, Loveday Road, W.13.
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l.*
- 1930 NIBLETT, M., 10, Greenway, Wallington, Surrey. *galls.*
- 1936 NORTON, S. G. WALLIS, "Norton House," Peaks Hill, Purley, Surrey. (*Life Member.*) *ent.*
- 1939 ODD, D. A., 11, Wickham Avenue, Cheam, Surrey. *l.*
- 1932 O'FARRELL, A. F., "Oaklands," Old Post Office Road, Crawley, Sussex. *od, cr, ent.*
- 1934 OLIVER, G. B., "Hazlemere," High Wycombe, Bucks. *l.*
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, S.E.3. *l.*
- 1940 PAYNE, L. G., 22, Marksbury Avenue, Richmond, Surrey. *c.*
- 1940 PAYNE, R. M., 22, Marksbury Avenue, Richmond, Surrey. *c.*
- 1908 PENNINGTON, F., 47, "Apsley House," Finchley Road, N.W.8. *l.*
- 1928 PERKINS, J. F., B.Sc., F.R.E.S., 95, Hare Lane, Claygate, Surrey. *hym.*
- 1933 PEYTON, A. G., 29, Grove Road, Ramsgate. *l.*
- 1933 PINHEY, E. C. G., 36, Wetherby Mansions, Earl's Court Square, London, S.W.5. *ent.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, E.4. *od, l.*
- 1933 POOLES, S. W. P., "Richmond," Alderman's Drive, Peterborough. *l.*
- 1912 POULTON, Prof. Sir E. B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)
- 1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane, Richmond, Surrey.
- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 136, Coldershaw Road, W. Ealing, W.5. *l, mo.*
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middlesex. *l.*
- 1936 RICHARDSON, N. A., 68, Finchley Lane, Hendon, N.W.4. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Surrey. (*Life Member.*)

YEAR OF
ELECTION.

- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon, S.W.20. *l.*
- 1939 RIPPON, C., M.A., J.P., F.R.E.S., "Red Lodge," Cold Ash, Newbury, Berks. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark. *l, n.*
- 1936 ROYFFE, D. W., 33, Thornhill Road, Surbiton, Surrey. *c, ent.*
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading.
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., "Scarbank House," Swanage, Dorset. *l.*
- 1936 RUSSELL, J. A. P., "Scarbank House," Swanage, Dorset. *ent.*
- 1915 RUSSELL, S. G. CASTLE, "Cotswold," Forest Gardens, Lyndhurst, Hants. *l.*
- 1939 SCHABBEL, Miss HILDA, Joldwynds Stables, Holmbury St Mary, near Dorking, Surrey. *b, ent.*
- 1936 SCOPES, GOWING E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l.*
- 1908 ST AUBYN, Capt. J. G., F.R.E.S., F.R.P.S., 14, Purley Knoll, Purley.
- 1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Ralli Bros., Ltd., Calcutta. (*Life Member.*) *l.*
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough. *l.*
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1938 SHERRIN, W. R., A.L.S., F.Z.S., South London Botanical Institute, 323, Norwood Road, Herne Hill, S.E.24. *c, l.*
- 1898 SICH, ALF., F.R.E.S., "Coburg Court Hotel," Bayswater Road, W.2. *l.*
- 1939 SIVITER-SMITH, P., "Squirrels," Little Aston Park, Streetly, Staffs. *l.*
- 1921 SMART, Major H. D., R.A.M.C., M.D., D.S.C., F.R.E.S., 172, High Road, Salway Hill, Woodford Green. *l.*
- 1939 SMITH, S. GORDON, F.L.S., F.R.E.S., "Estyn," Boughton, Chester. *ent.*
- 1938 SNELL, B. B., "Woodsome," Bromborough, Cheshire. *Heterocera.*
- 1908 SPERRING, C. W., 85, The Manorway, Blackheath, S.E.3. *l.*
- 1938 STAFFORD, A. E., "Corydonis," 83, Colbourne Way, Worcester Park, Surrey. *l.*
- 1927 STANLEY-SMITH, F., F.R.E.S., *Council*, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1928 STANLEY-SMITH, Mrs MAUD, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1937 STEDALL, H. P. P., "Cherry Cottage," Prestwood, Great Missenden, Bucks. *ent.*
- 1940 STEEL, W. D., 16, Upsdell Avenue, Palmers Green, N.13. *c.*
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham. *c.*

YEAR OF
ELECTION.

- 1936 STIGAND, Miss B., 40, Balcombe Street, Dorset Square, N.W.1.
hortic. ent.
- 1938 STIRLING, D. H., 36 Estella Avenue, New Malden, Surrey. *l.*
- 1924 STOREY, W. H., 3, Highlands Road, Reigate, Surrey. *ent.*
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., "Sevenhurst," 42, Chalkwell Avenue, Westcliff-on-Sea, Essex.
- 1936 STREETER, ERNEST, Petworth, Sussex. *l.*
- 1929 STUBBS, G. C., Survey Office, Kuala Lumpur, Federated States of Malay.
- 1938 SUMMERS, E. J., 33, Cumnor Road, Sutton, Surrey. *c, hem.*
- 1934 SUTTON, G. R., *Council*, 6, Kenilworth Gardens, Loughton, Essex.
l, c.
- 1916 SYMS, E. E., F.R.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *n, orth, od, t.*
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, S.W.6. *l.*
- 1913 TACHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1934 TAYLOR, J. O., 176, Petts Wood Road, Petts Wood, Kent. *l.*
- 1925 TAYLOR, J. S., M.A., F.R.E.S., P.O. Box 45, Graaff-Reinet, C.P., Union of S.A. *l.*
- 1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.
- 1931 THOMPSON, J. A., F.R.E.S., Rhos School, Colwyn Bay, N. Wales. *l.*
- 1935 TOMPKINS, L. H., "Clifton," 18, Forest Side, Worcester Park, Surrey.
- 1937 TONGE, A. E., F.R.E.S., "Ashville," Trafford Road, Alderley Edge, Cheshire. *l.*
- 1934 TUNSTALL, H. G., 11, St James Avenue, Ewell, Surrey.
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. (*Hon. Member.*) *l, b, e l.*
- 1940 TURNER, A. D., 19, Wychwood Close, Canon's Park, Middlesex.
ent.
- 1937 VALLINS, F. T., 2, Tattenham Grove, Epsom Downs, Surrey. *l.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. CHAS., 9, Priory Road, Hook Road, Surbiton, Surrey. *l.*
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 7, Parkside Gardens, Wimbledon, S.W.19. *l.*
- 1930 WAKELY, S., *Council*, 17, Warminster Road, S. Norwood, London, S.E.25. *l.*
- 1936 WARRIER, R. E., 147, Friern Road, London, S.E.22. *l.*
- 1939 WATKINS, NORMAN A., "Belcombe Court," Bradford-on-Avon, Wilts. *l.*
- 1920 WATSON, D., "Crossways," Hightown, Ringwood, Hants. *l.*
- 1928 WELLS, CLIFFORD, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., "York Gate," Cheam Road, Ewell. *l.*
- 1937 WELTI, A., "Foxbush," Tillingdown Lane, Caterham, Surrey. *l.*

YEAR OF
ELECTION.

- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. Sir H. BECKWITH, M.B., M.S.LOND., F.R.C.S., F.R.E.S., 62, Hagley Road, Birmingham, 16. *l.*
- 1925 WILLIAMS, H. B., LL.D., F.R.E.S., *Vice-President*, "Croft Point," Bramley, Surrey.
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, E.4. *l.*
- 1938 WILLIS, J. R., Vine Cottage, West Horsley, Surrey. *l.*
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
- 1926 WOOTTON, W. J., F.R.H.S., "Wannock Gardens," Polegate, Sussex. *l.*
- 1927 WORMS, BARON DE, M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., *Council*, "Milton Park," Egham, Surrey. *l, orn.*

Members will greatly oblige by informing the Hon. Sec. of any errors in, additions to, or alterations required in the above addresses and descriptions.

REPORT OF THE COUNCIL FOR 1939-40.

The year 1939 has been one of many changes and difficulties for the Society. These commenced in June, a few weeks before the removal of our landlords to other premises, with the intimation that although we would be welcome in the new premises, our library and collections would not be; it was, therefore, obvious that we should have to seek new quarters where we could both hold our meetings and house the library and collections.

In this difficulty, the Royal Entomological Society of London was most helpful, and not only put its meeting room at our disposal for meetings, but generously offered to accommodate our cabinets at 41 Queen's Gate, free of charge, until suitable permanent accommodation became available. These offers were gladly accepted, and the Society held five general meetings at Queen's Gate. The Council wishes to place on record an expression of the gratitude of the Society for this timely assistance.

After an unsuccessful search for suitable accommodation, it was suggested that Southwark Cathedral might have some premises which would afford a headquarters for the Society, and we have been able to come to a mutually satisfactory agreement with the Chapter and Trustees of the Chapter House, St Thomas's Street, and it has now been possible for us to instal our library and collections at this address and to hold our meetings there.

The Society is thus able to maintain its "South London" tradition and its establishment in these new quarters will, it is hoped, herald a new epoch in the life and activity of the Society.

There have been eighteen ordinary meetings, held at Hibernia Chambers (ten), 41 Queen's Gate (five), and the Chapter House (three). The war having made travel more difficult, it was decided at the Council meeting held after the first general meeting at the Chapter House that the Society should hold one meeting per month on the second Saturday, until March, when the position would be reviewed. An experimental meeting held in the Crypt was tried at 5.30 in the evening, but the attendance was such that it was decided to allow the question of evening meetings to pass for the time being. There were several adverse factors, however; the notice was short, the evening was wet and cold, and some members failed to find the meeting place, and at a subsequent Council it was decided that this matter should be referred again to the members at the Annual General Meeting.

An ambitious programme of twenty-four outdoor meetings was being carried on, but this had to be modified. The experimental winter programme inaugurated last year was continued, and, thanks to the kindness of the Trustees, the Society paid a visit, on a Sunday afternoon in January, to the Rothschild Museum at Tring. The large at-

tendance (40) is a fitting tribute to the courtesy of Dr Karl Jordan, who gave up his afternoon in order to show members around.

Field Meetings were held at Effingham, Witley, Abbot's Wood, Bookham, Horsley, Liphook, Isle of Wight, Darenth Wood, Box Hill, Clandon, New Forest, Benfleet, Royston, Eynsford, and Wendover; the meetings at Berkhamstead and Tilgate Forest were dropped for seasonal and weather reasons, while the advent of war necessitated the cancellation of the remaining five outdoor meetings. The average attendance at field meetings was nine. These Field Meetings were led by Messrs T. R. Eagles, F. D. Coote, R. F. Haynes, C. N. Hawkins, S. G. Wallis Norton, S. Wakely, R. W. Attwood, F. J. Coulson, F. D. Buck, F. Stanley Smith, G. R. Sutton, and H. G. Denvil; the efforts of which gentlemen made practicable the various meetings, and added to the enjoyment of those attending.

Papers were contributed by Mr G. A. and Mrs Brett (not published), Baron de Worms, Dr E. A. Cockayne, Mr C. N. Hawkins, Mr M. Niblett, Mr L. T. Ford, and Dr G. V. Bull. The Right Reverend Dr W. G. Whittingham gave a talk on Micro-lepidoptera, illustrating his remarks with lantern slides from the Robert Adkin bequest collection. Miss Cynthia Longfield showed films taken during her tour in S. Africa, depicting the fauna and flora, and a discussion took place on "Assembling," initiated by a contribution submitted by Mr R. W. Attwood.

To all those contributors mentioned the thanks of the Society are due for the care and trouble taken in the preparation of these most useful and interesting papers.

As a whole, the year has not been unsuccessful from an entomological point of view, although in certain districts, particularly in the New Forest, insects were not as plentiful as might have been hoped.

Owing to the difficulty of travel and the darkened evenings, it was decided that the Society should not attempt to hold an Exhibition this year, but would-be exhibitors were asked, instead, to write descriptions of their abnormal captures, so that these might be put on record. Mr Castle Russell has kindly offered to edit these notes and they will appear both in the "Entomologist's Record" and in the "Proceedings" of the Society.

The Treasurer's report will have impressed on you that although the Society has been able to meet the various additional expenses attendant on the removal of our Library and collections, and the warehousing of the library, the present crisis must of necessity lessen our membership in the coming year, so that every effort should be made to bring in new members to the Society. The membership for the current year shows an increase of one over 1938, and comprises 209 full members, 45 country members, 5 life members and 2 honorary members; there were four deaths and six resignations, while eleven new members have been elected to the Society.

The annual volume of Proceedings and Transactions for 1938/1939 appeared in July, and comprises 125 + xxii pp. and ten plates. It has been reviewed with approval by the various entomological papers, and contains much that will have lasting interest for entomologists and naturalists in general.

The Curator reports that the collections have been returned safely to the new meeting rooms after their storage at Queen's Gate, and that additions have been received from the following:—Mr J. Stephens: a specimen of the very rare beetle *Langelandia anophthalma*, Aub., taken at Chatham. Messrs F. T. Grant and S. Wakely also made donations.

The Librarian reports the safe warehousing and return of the library; borrowing has, of necessity, been curtailed, owing to the fact that for half the year the library was not available. The usual periodicals obtained by exchange, purchase and gift have been added, of which the following is a List.

PERIODICALS.—Entom. News; Entom. Monthly Magazine; Vasculum; Entomologist; Amateur Entomologist; Natural History Magazine; Entomologist's Record; Entomologiste Behefte.

SEPARATES.—Smithsonian Institute; Shanghai Institute; Field Museum, Chicago; K. J. Hayward, Hesperidiæ; and various.

VARIOUS.—Catalogue of the Publications of Dr Junk; Birds of the Malay Peninsular and Siam, per Un. States Nat. Museum; Key to the British Coxidæ, per The Biological Assn. of the Br. Empire.

TRANSACTIONS, PROCEEDINGS, ETC.—Cambridge Bulletin; Jnl. Lloyd Library; Trans. Wisconsin Academy; Zoologista Bidrag Upsala Inst.; Trans. Norfolk and Norwich Nat. Soc.; Bull. Ent. Soc. de France; Proc. Ent. Soc. of Brit. Columbia; Bulletin Min. of Agric. Argentina; Bulletin O'Hara Institute; Anale de la Escuela Nacional de Ciencias Biologicas; Proc. United States Museum; Jnl. Soc. of British Entomology; Trans. Herts. Nat. Hist. Soc.; Report (1938) American Museum of Natural History; Catalogue of Library S.E. Union of Scientific Societies; Trans. Connecticut Academy of Arts and Sciences; Jnl. London Nat. Hist. Soc. (1938) and London Bird Report for 1938; Trans. Torquay Nat. Hist. Soc.; Essex Naturalist; Proc. 1938 Isle of Wight Nat. Hist. Soc.; Proc. Royal Irish Academy; S.E. Antiquary and Naturalist; Argentine Revista Portici Bolletina; Argentine Science Museum, Report; Report of the Entomological Society of Ontario; Trans. Society of British Entomology; Jnl. Field Museum; and numerous Separates.

HON. TREASURER'S REPORT, 1939.

This year I have to report an excess of Expenditure over Income. Our Income was £157 7s 6d and we have spent £165 0s 3d. We have thus overspent to the tune of £7 12s 9d. It is due to the removal expenses. These were £21 15s 6d. The expenses were double what they might have been because we had to take our effects to temporary quarters while we were homeless and later move them to the Chapter House. Last year I was able to provide £5 towards these expenses, leaving £16 15s 6d to be borne this year. There has been a decrease in some of the other items of expenditure, but nevertheless our income is short of our expenditure by £7 12s 9d. For many years we have had small excesses of income over expenditure and we had at 1st January, 1939, built up a total of £61 2s 6d in readiness for emergencies. So we need not be dismayed. It would, however, be idle to shut our eyes to the fact that there are difficult days ahead for us. Our subscription income may fall, for I fear there may be fewer new members to replace losses. All of us will be hard hit financially by the War, but I hope all will contrive to maintain their subscriptions to the Society.

BALANCE SHEET.

You will find that the value of our investments has fallen by nearly £50 as compared with last year. This is not surprising. Indeed, what is surprising is that despite the War our investments are worth more than the Society paid for them. The Balance Sheet shows £15 17s interest owing to the Society. This is because the Bank of England had not at the date of closing the accounts paid over the interest on the investments pending the completion of certain formalities in connection with the death of Mr Tonge, of Reigate, who was a Trustee.

INCOME AND EXPENDITURE ACCOUNT.

It will be observed that the income from subscriptions is a trifle less than last year. It should have been more than last year, and I have no doubt it would have been so had the *Conversazione* taken place in October. I used to collect many subscriptions on those evenings. On the other hand, the fact that there was no *Conversazione* has relieved the accounts to the tune of several pounds because the donations towards the Exhibition Expenses never quite covered the cost. This year £83 had to be found for the Publication Fund against £65 last year. The other expense items were much as usual except for the removal expenses, to which I have already alluded.

CAPITAL ACCOUNT.

You will find an item of One Pound Ten Shillings for Entrance Fees, representing twelve new members. This is less than last year. As you

know, we have always recruited some new members at the Annual Conversation and Exhibition. Let us hope we shall soon be able to hold another.

LIBRARY FUND.

The Council bought only one book during the year. So many books were acquired in 1938 that the respite is not surprising.

ILLUSTRATIONS FUND.

Again we have had an anonymous donation of £20, of which £15 16s 1d was spent. This is the fourth such donation we have had and I hope none of us will lose sight of the fact that but for the generosity of this good friend of the Society we should not have had a balance in hand out of which to meet our removal expenses. I am sure you will all heartily endorse my expression of gratitude to our benefactor.

Our thanks are due to Mr F. J. Coulson, the Council's auditor, and to Mr F. D. Buck, the Members' auditor, for auditing my accounts.

T. R. EAGLES.

The South London Entomological and Natural History Society. STATEMENT OF ACCOUNTS.

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BALANCE SHEET at 31st December 1939.

Capital Fund—		Investments at Cost—	
General	...	General (including Ashdown,	
Publication	...	Lachlan-Gibb, Lile, and Robert	
	...	Adkin bequests)	
Special Funds—		£591 15s 3d 3½% Conversion Stock ...	£545 11 6
Library	...	£154 14s 0d 4% Consols ...	131 14 10
Publication	...		
Illustrations	...		£677 6 4
	...	Publication (Gift of the Misses	
Subscriptions paid in advance	...	E. F. and L. M. Chapman in	
Expenses owing	...	memory of their brother)	
Income and Expenditure Account—		£300 3½% War Stock ...	304 19 9
Balance at 1st January 1939	...		£982 6 1
Deduct Excess of Expenditure over	...	Note.—Market value at 31st Decem-	
Income of the year	...	ber 1939, £994.	
	...	Interest owing to the Society ...	...
	...	Cash at Bank—	15 17 0
	...	Deposit Account ...	£80 0 8
	...	Current Account ...	8 0 7
	...		
	...	Cash in Hand ...	88 1 3
	...		1 10 9
	...		£1087 15 1

Examined and found correct, 20th January 1940.

F. J. COULSON, *Council's Auditor.*

F. D. BUCK, *Members' Auditor.*

T. R. EAGLES, *Hon. Treasurer.*

NOTE.—The Society's Books, Cabinets, Collections, etc., are insured for £1000.

INCOME AND EXPENDITURE ACCOUNT—Year to 31st December 1939.

Rent of Rooms ...	£43 8 0	Subscriptions (Arrears and Current) ...	£135 2 6
Insurance ...	1 12 6	Interest—	
Attendance ...	2 5 0	£154 14s 0d 4 % Consols ...	£6 3 8
Secretarial Expenses ...	10 8 10	£591 15s 3d 3½ % Conversion Stock ...	20 14 2
Treasurer's Expenses ...	2 10 3	Deposit Interest ...	1 19 3
Carriage of Projector ...	0 15 0		
Printing and posting notice suspend- ing meetings ...	1 2 2	Income Tax ...	£28 17 1
			7 9 7
	£62 1 9		21 7 6
Subscriptions—		Donations towards 1938 Exhibition Expenses re- ceived after the close of that year ...	0 17 6
South Eastern Union of Scientific Societies ...	£0 15 0	Balance, being the Excess of Expenditure over Income carried to Balance Sheet ...	7 12 9
Commons, Open Spaces, and Foot- paths Preservation Society ...	0 10 6		
The Ramblers' Association (Southern Federation) ...	0 7 6		
Grant to Library Fund ...	1 13 0		
Grant to Publication Fund ...	1 10 0		
Removal Expenses (£21 15s 6d, less £5 0s 0d pro- vided last year) ...	83 0 0		
	16 15 6		
	£165 0 3		£165 0 3

CAPITAL ACCOUNT—Year to 31st December 1939.

Transfer to Library Fund ...	£1 10 0	Balance at 1st January 1939 ...	£991 11 10
Balance at 31st December 1939 ...	991 11 10	Entrance Fees ...	1 10 0
	£993 1 10		£993 1 10

LIBRARY FUND—Year to 31st December 1939.

Book purchased	...	...	£0 19 0	Balance at 1st January 1939	...	...	£1 12 8
Binding	...	...	1 13 0	Transfer from Capital Account	...	...	1 10 0
Subscription to Entomologist's Monthly Magazine	...	...	0 15 0	Grant from Income and Expenditure Account	...	...	1 10 0
Balance at 31st December 1939	...	...	1 5 8				
			£4 12 8				£4 12 8

PUBLICATION FUND—Year to 31st December 1939.

Printing Proceedings	...	...	£89 10 0	Balance at 1st January 1939	...	...	£2 7 4
Postage of same	...	...	4 12 0	Donations	...	...	1 3 6
Balance at 31st December 1939	...	...	1 10 5	Sale of Proceedings	...	...	1 9 4
				Interest on 3½ % War Stock (Misses E. F. and L. M. Chapman) £10 10s, less £2 17s 9d Income Tax	7 12 3
				Grant from Income and Expenditure Account	83 0 0
			£95 12 5				£95 12 5

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ILLUSTRATIONS FUND—Year to 31st December 1939.

Blocks	£8 9 1	Balance at 1st January 1939	£25 1 6
Printing Illustrations	...	...	7 7 0	Donation	...	...	20 0 0
Balance at 31st December 1939	...	...	29 5 5				
			£45 1 6				£45 1 6

ABSTRACT OF PROCEEDINGS.

9th FEBRUARY 1939.

H. B. WILLIAMS, Esq., LL.D., F.R.E.S., President, in the Chair.

Mr A. G. Brown, L.D.S., R.C.S., 17 The Vale, Golders Green, was elected a member.

Mr J. O. T. Howard exhibited four specimens of *Acherontia atropos*, L., forced at 70°-80° F. during November and December 1938, from pupae found in potato fields near Dungeness.

Mr F. Grant exhibited a mass of old cocoons of the "Honey Moth," *Galleria mellonella*, L., found on the underside of a deal board lying on the earth under other timber.

Mr Hy. J. Turner exhibited series of *Leucania l-album*, L. (1) from the S. coast of England, and (2) from Austria, Cannes and Germany, for comparison. The comparison showed but little difference, the British examples being perhaps slightly the darker.

Mr C. N. Hawkins exhibited a living immature larva of *Heliothis armigera*, Hb., given to him by Mr E. B. Britton, of the Brit. Museum (Nat. Hist.), and found in imported Tomatoes. Country of origin not known. He also exhibited some preserved larvae of the same species, sent to him by Mr D. G. Sevastopulo from India, and several preserved examples showing various forms of the larva of the allied species, *H. peltigera*, Schiff., from English localities.

Mr J. Deal exhibited some supposed parasitic flies taken from a breeding cage containing larvae of *Melitaea athalia*, Rott. The larvae were put into a clean cage and fed up on narrow-leaf plantain. When hibernating they formed up in groups and spun a slight web over each group. The larvae appear to be perfectly healthy. Nothing else was put in the cage. The food plant was left in cage and died off. They were subsequently identified by Mr H. W. Andrews as an *Agromyzid* leaf-miner in the plantain.

Dr de Worms exhibited examples of species of the genus *Oporinia* (*Oporabia*) *autumnata*, Bork., *O. christyi*, Prout, and *O. dilutata*, Schiff., and read notes on their distribution. He also exhibited dark forms of *Monima* (*Taeniocampa*) *populi*, Stroem., (*populeti*, Fb.) from Kent, *Nola strigula*, Schiff., from Shetlands, with specimens from the South for comparison, and three stages of the larva of *Epunda lichenea*, Hb.

A Paper on the Acarina by Mr G. A. Brett and Mrs Brett was read.

23rd FEBRUARY 1939.

The PRESIDENT in the Chair.

It was announced that owing to the sudden indisposition of Mr Bushby the talk on "Insects at the Zoo," which was to have been given by him, had unfortunately to be postponed.

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The President then referred to letters in "The Times" during the current week reporting the occurrence of specimens of *Vanessa atalanta*, L., on the wing, and a considerable discussion took place as to the hibernation habits of this and allied species in England and elsewhere. A number of members had seen specimens of *atalanta* on the wing in early spring in different years and it was suggested that this is normally an immigrant species, that it is able to hibernate in this country, but that a lower temperature than is needed to tempt such species as *Aglais urticae*, L., or *Nymphalis io*, L., to flight will awaken it, and that consequently a number of hibernators are destroyed by leaving hibernation too early. It was suggested that *Vanessid* species do not normally resume hibernation after these early flights, and that unless they can obtain some food, or at any rate some sunshine, they must perish.

Mr Jacobs reported having seen numbers of *Nymphalis antiopa*, L., flying over snow in Canada some years ago, and a discussion took place on the occurrence of this species in Britain. The President pointed out that early entomologists had correctly differentiated the "white-bordered" form usually taken in this country from the "yellow-bordered" form usually taken in France and Switzerland, and said it was regrettable that the opinion that our white-bordered specimens were faded examples of the yellow-bordered form was still being published, notwithstanding that there are numbers of perfectly fresh white-bordered examples (taken, e.g., in 1872) in British collections, and that the structural distinction between the two forms had been studied and published by our member, Dr E. A. Cockayne, in 1921 ("Ent. Rec." XXXIII, 205-210). The white-bordered form occurs in Scandinavia, whence the great majority of our immigrant specimens have evidently come, and is recorded from N. America and Siberia and, as a rare form, from South and Central Europe. It is no doubt circumpolar in distribution and is distinguished from the yellow-bordered form by a scale defect which is probably hereditary.

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9th MARCH 1939.

Dr E. A. COCKAYNE, A.M., F.R.E.S., Vice-President, in the Chair.

Mr A. A. W. Buckstone exhibited (1) *Satyrus (Melanargia) galathea*, L., ♂ taken at Folkestone in July 1924, abnormal in the shape of the wings and in the markings. Also a ♂ and a ♀ both with the sub-apical spots of the forewings duplicated; from Chilham, Kent. (2) *Zygaena trifolii*, Esp., a black example taken in Sussex, July 1921; a *Z. filipendulae*, L., with abnormally narrow hindwings, from Shere, Surrey, July 1926, a ♂ with yellow marking taken at Clandon, Surrey, July 1920, and another with pinkish hindwings.

Mr A. Bliss exhibited specimens of *Nymphalis (Vanessa) antiopa*, L., bred from larvae obtained in France.

Mr F. D. Coote exhibited dwarf forms of *Polyommatus bellargus*, Rott., *Lycaena arion*, L., and *Brenthis euphrosyne*, L.

Mr Howard exhibited a diminutive specimen of *Porthesia similis*, Fuess., only 24 mm. in expanse; also two forms of *Eriogaster lanestris*, L., a pair from near Cambridge of the normal reddish colour and a pair from near Wimborne very distinctly grey, especially the male.

Dr E. A. Cockayne exhibited specimens of, and read a short paper on, two new British species of Lepidoptera (Geometridae):—*Ortholitha umbrifera*, Prout, and *O. scotica*, sp. nov. (See *Trans.*)

Mr R. F. Haynes exhibited very small examples of the three following species:—*Hylophila bicolorana*, Fuess., bred from a larva found on Ranmore Common, May 1938; *Leucoma (Stilpnotia) salicis*, L., bred from larva found at Clapton, June 1938; and *Euchloë cardamines*, L., caught wild in S.W. Ireland, May 1938.

Mr Hy. J. Turner placed on exhibition a show case containing the life-history of a dozen species of the Micro genus *Coleophora*, Zell., in view of the subsequent "Talk and Demonstration," "The Collection and Study of the Micro-lepidoptera," by the Right Reverend W. G. Whittingham, Lord Bishop of St Edmundsbury and Ipswich. This was illustrated by a selected series of lantern slides from the Robert Adkin bequest. A considerable discussion followed.

23rd MARCH 1939.

The PRESIDENT in the Chair.

Mr L. G. Hulls, Chidlam, near Chichester, was elected a member.

Dr G. V. Bull exhibited a series of *Triphaena comes*, Hb., bred from ova, Forres, resulting in equal numbers of the typical form and *f. curtisii*, Newm.

Mr Hy. J. Turner exhibited two specimens of a beautiful Sphingid from Manchuria, *Callambulyx tartarinovi*, Brem. & Gry. It was distributed from L. Baikal through Manchuria, the Amur district, N. China, and Japan. The larvae fed on elm. It was nearly related to the genus *Mimas*, Hb., in which our British *M. tiliae*, L., is placed. He also showed *Scoliopteryx libatrix*, L., and *Arctia caja*, L., from the same area. The latter had the usually tripartite mid-costal blotch fused into one large feature and the lighter areas were all considerably curtailed. He understood that this was a form rather common in northern latitudes. The President had met with this form in Britain.

Mr Wallis-Norton exhibited a number of minor aberrations of *Euchloë cardamines*, L.

Miss Cynthia Longfield then showed some excellent cinematograph films taken during her tour of South Africa, depicting the flora and fauna encountered. Several members commented upon the excellence of the photography.

13th APRIL 1939.

The PRESIDENT in the Chair.

Mr Claude Rippon, M.A., J.P., F.R.E.S., "Red Lodge," Cold Ash, Newbury, Berks, and Mr Norman Anstie Watkins, "Belcombe Court," Bradford-on-Avon, Wilts, were elected members.

Mr Deal exhibited a pupa of *Lasiocampa quercus*, L. The pupation took place on 20th March, a very early date.

Mr Hy. J. Turner exhibited two species of African *Papilio*. (1) *P. antimachus*, Dry., one of the largest of all known butterflies, of which the ♀ is excessively rare. Nothing is known of the life-history. Mountainous regions of Sierra Leone, W. Africa. (2) *P. zalmoxis*, Hew., another rare and local species of which he had never seen a female. Nothing is known of the life-history. From the forest regions of the Cameroons.

Dr E. A. Cockayne exhibited *Abraxas grossulariata*, L., ab. *nigroapicata*, Raynor, and ab. *melanapicata*, Porritt, and contributed the following note: "Like Raynor's type, the former are from York. Porritt's description of *melanapicata* is not detailed enough, but his type is in the Huddersfield Museum. The apices of the forewings are more rounded than usual and the whole of the anterior and outer part of the wings are black; the black coloration obscures the anterior third of the orange fascia and extends nearly to the anal angle. The specimen shown, which is from Hoddesdon, almost exactly matches the type. In *nigroapicata* the black blotch is 5 mm. long and only 3 mm. broad. Prout sinks *melanapicata* as a synonym, but this does not seem to be justifiable, though forms more or less intermediate occur." He also exhibited three specimens of a form resembling "Q" (Woodlock, "Journ. Genetics," 1915-16, 5, 183), but with the ground cream instead of white, from York, bred by S. Walker. The ground colour is like that of *lacticolor*, Raynor, but there are black markings on the underside. This he considered to be a definite entity.

Mr S. Wakely exhibited a larva of the cellar beetle, *Blaps mucronata*, Latr., from Norwood, two specimens of the beetle *Mezium affine*, Bois., from Finsbury, and a series of *Nemotois scabiosella*, Scop., from Coulsdon.

Dr Bull exhibited a series of *Tarniocampa (Monima) gracilis*, Fb., bred from Rannoch, with examples from N.E. Sussex and S.W. Kent for comparison.

Mr S. R. Ashby exhibited a specimen of *Chrysotoxum festivum*, L. (Dipt.), showing abnormal pattern giving a superficial resemblance to spiral segmentation.

A discussion then took place on "Insects at Sugar," opened by Dr de Worms. (See *Trans.*)

27th APRIL 1939.

The PRESIDENT in the Chair.

Mr Jacobs exhibited a Centipede (*Scolopendra* sp. ? *morsitans*, L.) from the East India Docks, discharged with a consignment of Jaffa oranges. This species (*morsitans*) is distributed along the North African coast, and also along the Spanish coast, so possibly it also extends into Palestine.

Dr de Worms exhibited young larvae of *Limenitis camilla*, L. (*sibilla*, L.), and gave hints on the way to find them.

Mr Turner exhibited two specimens of *Utetheisa* (*Deiopeia*) *pulchella*, L., and its f. *lotrix*, Cram., and stated that the latter was probably a distinct species.

Mr T. R. Eagles exhibited the larva of *Agrotis agathina*, Dup., taken at the Witley Field Meeting, Liv.39.

Mr M. Niblett exhibited the following Mollusca, *Helix nemoralis*, Müll., with several varieties, *H. aspersa*, Müll., *H. cantiana*, Mont., *H. caperata*, Mont., *H. rufescens*, Penn., and *H. rotundata*, Müll., *H. virgata*, Dac., and *Cyclostoma elegans*, Müll. He also showed the beetle, *Balanobius salicivorus*, Pk., bred from a gall on willow.

Dr Bull exhibited a series of *Taeniocampa* (*Monima*) *munda*, Esp., from S.W. Kent and N.E. Sussex. He also showed a fasciated flower-head of a daffodil produced by the growing together of five flower stems.

Mr Dennis exhibited a photograph of the ova of *Aglais urticae*, L. (Plate I.)

Mr Howarth exhibited larvae of *Aporophila australis*, Bdv., from Sandwich, with preserved larvae of both this species and of *Epunda lichener*, Hb.

The paper on Mollusca, which was to have been read by Mr R. A. Priske, had to be postponed owing to the illness of the author.

11th MAY 1939.

The PRESIDENT in the Chair.

Mr Andrews exhibited various species of British *Trypetidae* (Dip.).

Mr Wallis Norton exhibited (1) a dark form of *Taeniocampa* (*Monima*) *pulverulenta*, Esp.; (2) the ab. *fusca*, Mtly., of *Erranis marginaria*, Fb.; (3) a strongly marked form of *Parophila badiata*, Schiff., and (4) an unusual form in colour and marking of *Biston strataria*, Hufn., with normal forms for comparison.

Mr Hy. J. Turner exhibited examples of two species of *Utetheisa* (*Deiopeia*) from America, which had been mentioned at the last meeting, when the *U. pulchella*, L., of the Eastern Hemisphere had been under discussion. The species were *U. bella*, L., the very beautiful species found in the southern part of N. America, and the species *U. ornatrix*, L., which is widespread in S. America.

Mr F. T. Grant exhibited the local and rare Coleopteron, *Pediacus dermestoides*, Fab., of which he had taken some 30 specimens under the bark of a fallen hornbeam limb in Cobham Park in April 1939.

Mr T. R. Eagles exhibited specimens of the marine Arachnid, *Pycnogonum littorale*, C. F. Müller, from the Kent coast.

Mr J. O. T. Howard exhibited pupa, larva and cocoon of *Synanthedon vespiformis*, Lasp., from the New Forest, 7.v.39.

Mr Sterling exhibited the Mollusc, *Helix pomatia*, L., from Ranmore, where it occurs pretty commonly.

Mr M. Niblett exhibited the *Cynipidae*, (1) *Aylax caulicola*, Hed., a new species from galls in stems of *Pieris echioides*, L., and (2) *Andricus ranthopsis*, Schlt., from catkin galls on *Quercus sessiliflora*, Salb., recently established as the alternate generation of *Andricus glandulae*, Gir., the larva of which is the causer of a bud gall.

Dr G. V. Bull exhibited a parasite found on the imago of *Thera obeliscata*, Hb., and also a white "nest" of a spider.

Mr F. D. Coote exhibited ova of *Bapta distinctata*, H.S. (*pictaria*, Curt.), from an Effingham ♀. She would not lay in the box so twigs of blackthorn were given her and upon these about 30 ova were laid. He also exhibited the Coleopteron, *Rhagium mordax*, de G. (*inquisitor*, Fb.).

Attention was called to the interesting notes on the Bladderworts in a recent "Evening Standard." The plant occurs freely in the Cutt Mill ponds, feeding upon the minute inhabitants.

The President then congratulated Mr A. W. Dennis, who had just completed fifty years of membership of the Society, and he was asked to re-sign the Obligation Book.

25th MAY 1939.

Dr E. A. COCKAYNE, Vice-President, in the Chair.

Mr T. R. Eagles exhibited very young larvae of *Monima* (*Taenio-campa*) *populi*, Stroem (*populeti*, Fb.), and pointed out the way in which they fasten up a leaf in the earliest stages.

Mr J. A. Stephens exhibited some notable Coleoptera he had taken in or around Chatham, including *Quedius brevis*, Er., and *Xantholinus atratus*, Heer, 23.iii.39, both local and rare, from a nest of *Formica rufa*, L.; *Longitarsus castaneus*, St., 29.i.39, rare, in hay refuse; and *Amphotis marginata*, Fb., 24.v.39, beating hawthorn blossom, rare.

Dr G. V. Bull exhibited larvae of *Agrotis agathina*, Dup., two forms, *Triphaena comes*, Hb., *Boarmia repandata*, L., *Crocallis elinguaris*, L., *Noctua castanea*, Esp., f. *neglecta*, Hb., etc.

Mr D. H. Sterling exhibited larvae of *Hipparchus papilionaria*, L., *Strymon w-album*, Knoch, both from Kent; *Colotois* (*Himera*) *pennaria*, L., from the Holmwood, and ova of the remarkable exotic Saturniid, *Actias selene*, L.

Mr Hy. J. Turner exhibited specimens of the exotic Pierid, *Saletara panda*, Gdt., from Java, and its race *erebina*, Frhs., from Palawan, in

the Philippines. The species is very variable and is mostly common throughout Macromalaya in many local forms. There are two basic forms, from which others appear to be evolved. These are *f. nivaria*, Fruh., in which white predominates, and *f. sulphurea*, Voll., in which lemon-yellow is the prevailing colour; the other forms and races are subsidiary to these and founded on them. The butterflies are invariably found in the plains and always frequenting wet places, especially near rivers or puddles of water in the woods. They are said to have a considerable tendency to vary in the number of their veins, e.g., the right or left wing may have one more vein than in the other, one vein being often totally dropped on one side. Another species of Pierid exhibited was *Huphina judith*, Fb., from Java, with deep black wide margins of wings and veins of forewings, the interspaces of the forewings being white, and the whole central area of the hindwing being of different depths of orange and lemon colour.

Mr W. Dannatt exhibited the example of *Hadena peregrina*, Tr., taken by the late Mr R. McLachlan at Freshwater, I. of W., on 23.viii.1859, and referred to by Barrett in his "British Lepidoptera."

Mr R. W. Attwood exhibited the tubular nests of the Spider, *Atypus sulzeri*, Lat. (*piceus*, Sulzer), and read the following note:—"This Spider, a near relative of the Trap Door Spiders, was fairly common at the Liphook Field Meeting. Mr Wakely found the first when searching for a Micro-larva on Dwarf Furze. There are five tubular nests shown but only two contained spiders. One end of the tube rests on the surface of the Dwarf Furze and is carried through the bush and buried into the ground to a depth of about two inches, the spider being found at the foot, one spider in each tube. The spider has exceedingly large prominent falcies, and Mr Wakely says that in the Isle of Wight it is reputed to be able to inflict a very painful bite. In captivity, however, the spider seems to be rather timid."

8th JUNE 1939.

The PRESIDENT in the Chair.

An announcement was made that owing to the inability of the London Provision Exchange to accommodate the Society's Library and Collections in their new buildings the meetings of the Society, until further notice, would be held in the rooms of the Royal Entomological Society of London, S. Kensington.

Mr Eagles exhibited living larvae of *Brephos notha*, Hb., and of *Scopelosoma satellitia*, L.

Mr G. Howarth exhibited a larva of *Cleora lichenaria*, Hufn., larvae of *Xylina ornithopus*, Rott., and of *S. satellitia*, L., from Brandon, Suffolk. He also showed leaves of the common clover with 5, 4 and 3 leaflets.

Mr S. W. C. Williams exhibited larvae and pupae of *Sterrrha* (*Ptychopoda*) (*Acidalia*) *aversata*, L., from ova laid by a female taken at Chingford in August 1938.

Mr F. D. Buck exhibited a few species of beetles from Liphook (21.v.39) and Chingford (28.v.39 and 3.vi.39). From Liphook, *Molorchus minor*, L., and for comparison *M. umbellaturum*, Shb. (from Box Hill). An unusual variety of *Anatis ocellata*, L. showing none of the usual black marks ringed with white. Also, *Rhynchites cavifrons*, Gy., and *R. cupreus*, L. From Chingford, *Melandrya caraboides*, L., and *Calosoma inquisitor*, L. The *Melandrya caraboides*, L., was found under the loose bark of a dead log and on the tree trunk during the night. *Calosoma inquisitor*, L. (two specimens), were taken on oak trunks during the night. Three other specimens have been taken from the same locality, one at the foot of an oak and the other two were found running on paths. All five specimens were taken during the four weeks, 13.v.39 to 3.vi.39.

Mr Hy. J. Turner exhibited a species of *Lycuonidae*, *Zeltus etolus*, Fb., from Northern India, where it is common from the Himalaya to the Nilgiri Mts. and as far east as Burma. It is remarkable for the extraordinary fineness and length of the tails of the hindwings, which are of a beautiful lustrous satiny-white colour. The delicate nature of these tails makes it very rarely possible to obtain perfect examples of the insect.

Reports of various Field Meetings presented by the respective leaders were read, and also that of the visit to the Zoological Museum at Tring.

As usual various members related their experiences of the present season in the field.

22nd JUNE 1939.

[At the Rooms of the R.Ent.Soc'y., 41 Queen's Gate, S.W.7.]

The PRESIDENT in the Chair.

Mr A. J. L. Bowes, of Herne Bay, was elected a member.

Mr H. Main exhibited living examples of the "Field Cricket," *Gryllus campestris*, L., and of the "Wood Cricket," *Nemobius sylvestris*, Fb.

Mr Sterling exhibited ab. *taras*, Meign., of *Hesperia (Syrichthus) malvae*, L., from Swanage; a *Nisoniades (Erynnis) tages*, L., with a bleached (xanthic) forewing; and larvae of *Thymelicus acteon*, Rott., from Swanage.

Mr Humphrys exhibited a melanic form (ab. *concolor*, Stdgr.?) of *Dasychira pudibunda*, L., with normal form for comparison, also a specimen of *Mysticoptera sexalata*, Retz. (*sexalisata*, Hb.), showing the small additional lobes on the hindwings, which is such a feature of the male sex in this genus.

Mr Eagles exhibited a bred specimen of the "tree-hole mosquito," *Aedes geniculatus*, Olivier, from Epping Forest; a larva of *Amphipyra pyramidea*, L., with a Hymenopteron observed in the act of parasitizing it.

Dr E. A. Cockayne exhibited the following hybrid Lepidoptera in illustration of his paper subsequently read:—

Male Parent.	Female Parent.	Name of Hybrid.
<i>Smerinthus ocellatus</i>	<i>Laotioë (Amorpha) populi</i>	<i>S. hybridus</i> , Stephens (a male and two intersexes).
<i>Malacosoma neustria</i>	<i>M. castrensis</i>	<i>M. neustrensis</i> , Klemann.
<i>Cerura furcula</i>	<i>C. bicuspis</i>	<i>C. furcuspis</i> , Bowater (1925).
<i>Notodonta ziczac</i>	<i>N. dromedarius</i>	<i>N. newmani</i> , Tutt.
<i>Clostera (Pygaera) curtula</i>	<i>C. pigra</i>	<i>C. prima</i> , Tutt.
<i>C. pigra</i>	<i>C. curtula</i>	<i>C. inversa</i> , Tutt.
<i>Cynatophora octogesima</i>	<i>C. or</i>	<i>C. fletcheri</i> , Tutt.
<i>Cosymbia pendularia</i>	<i>C. orbicularia</i>	<i>C. pendulo-orbicularia</i> , Tutt.
<i>C. orbicularia</i>	<i>C. pendularia</i>	<i>C. orbiculo-pendula</i> , Tutt.
<i>C. orbicularia</i>	<i>C. annulata</i>	<i>C. headi</i> , Tutt.
<i>C. pendularia</i>	<i>C. annulata</i>	Unnamed.
<i>Oporinia dilutata</i>	<i>O. autumnata</i>	<i>O. robsoni</i> , Harrison.
<i>O. autumnata</i>	<i>O. fligrammaria</i>	Unnamed.
<i>O. fligrammaria</i>	<i>O. autumnata</i>	Unnamed.
<i>Thera variata</i>	<i>T. obeliscata</i>	<i>T. woodi</i> , Ckyné (1907).
<i>T. obeliscata</i>	<i>T. variata</i>	<i>T. prothi</i> , Ckyné (1927).
<i>Cabera pusaria</i>	<i>C. exanthemata</i>	<i>C. fletcheri</i> , Tutt.
<i>C. exanthemata</i>	<i>C. pusaria</i>	Unnamed.
<i>Biston strataria</i>	<i>B. betularia</i>	<i>B. herefordi</i> , Tutt.
<i>Ennomos autumnaria</i>	<i>E. quercinaria</i>	<i>E. dartfordi</i> , Tutt.
<i>Selenia bilunaria</i>	<i>S. tetralunaria</i>	<i>S. parvilunaria</i> , Bartel.
<i>Poecilopsis lapponaria</i>	<i>S. bilunaria</i>	<i>S. tetralunaria</i> , Klemann (1928).
<i>Nyssia (Ithysia) zonaria</i>	<i>Nyssia (Ithysia) zonaria</i>	<i>P. smaltmani</i> , Harrison.
<i>N. (Ithysia) zonaria</i>	<i>Poecilopsis lapponaria</i>	<i>N. (I.) merana</i> , Burrows.
<i>Lycia hirtaria</i>	<i>Lycia hirtaria</i>	<i>N. (I.) harrisoni</i> , Harrison (including a gynandromorph).
<i>Lycia hirtaria</i>	<i>Nyssia (Ithysia) zonaria</i>	<i>L. denhami</i> , Harrison.
<i>Poecilopsis lapponaria</i>	<i>Poecilopsis lapponaria</i>	<i>L. veltacei</i> , Harrison.
<i>Ectropis bistortata</i>	<i>Lycia hirtaria</i>	<i>P. teesi</i> , Harrison (1938).
<i>E. crepuscularia</i>	<i>E. crepuscularia</i>	<i>E. ridingsi</i> , Tutt.
	<i>E. bistortata</i>	<i>E. bacoti</i> , Tutt.

Also a secondary hybrid of *Zygaena lonicerae* and *Z. trifolii*.

Mr C. N. Hawkins showed examples of the following hybrid Lepidoptera together with the two sexes of both parent species in each case for comparison:—

Male Parent.	Female Parent.	Name of Hybrid.
<i>Smerinthus ocellatus</i> , L.	<i>Laotioë (Amorpha) populi</i> , L.	<i>S. hybridus</i> , Steph.
<i>Notodontia clezar</i> , L.	<i>N. dronedarius</i> , L.	<i>N. newmani</i> , Tutt.
<i>Chlosia curtula</i> , L.	<i>C. piara</i> , Hufn.	<i>C. prima</i> , Tutt.
<i>Selenia bilunaria</i> , Esp.	<i>S. tetralunaria</i> , Hufn.	<i>S. parvilinearis</i> , Bartel.
<i>Nyssia (Ithysia) zonaria</i> , Schiff.	<i>Lycia hirtaria</i> , Cl.	<i>N. harrisoni</i> , Harrison.
<i>Lycia hirtaria</i> , Cl.	<i>Nyssia (Ithysia) zonaria</i> , Schiff.	<i>L. denhami</i> , Harrison.
<i>L. hirtaria</i> , Cl.	<i>Poecilopsis lapponaria</i> , Bdv.	<i>L. wallacei</i> , Harrison.

In the case of the last mentioned hybrid he also showed three preserved examples of the hybrid larvae as well as preserved larvae of both parent species for comparison, and read a short paper giving his breeding results. (See *Trans.*)

Dr Harold B. Williams exhibited the following hybrids:—

Male Parent.	Female Parent.	Name of Hybrid.
<i>Lycia hirtaria</i> , Cl.	<i>Poecilopsis lapponaria</i> , Bdv.	<i>L. wallacei</i> , Harrison. A series bred April 1939.
<i>L. hirtaria</i> , Cl.	<i>Nyssia (Ithysia) zonaria</i> , Schiff.	<i>L. denhami</i> , Harrison. A series of males, the only sex known in this hybrid.
<i>Nyssia (Ithysia) zonaria</i> , Schiff.	<i>L. hirtaria</i> , Cl.	<i>Nyssia (Ithysia) harrisoni</i> , Harrison. Males and females of this hybrid.
<i>Selenia bilunaria</i> , Esp., f. <i>illumaria</i> Esp.	<i>S. tetralunaria</i> , Hufn., f. <i>aestiva</i> , Stdgt.	<i>S. parvilinearis</i> , Bartel. A male and a female.
<i>Smerinthus ocellatus</i> , L.	<i>Laotioë (Amorpha) populi</i> , L.	<i>S. hybridus</i> , Steph. Four males.

Also *Polyommatus icarus*, Rott., a large ♂, of very bright coloration, with heavy marginal spots on hind-wings, which may possibly be a hybrid with *Lysandra (Polyommatus) bellargus*, Rott. (*thetis*, Rott.), and larvae, living, of *Lycia hirtaria*, Kensington; *Nyssia zonaria*, f. of Coll; *L. hyb. denhami*, Harr. (London and Cheshire).

Dr G. V. Bull exhibited *Melitaea aurinia*, Rott., bred from Dorset larvae, and reported masses of "goose-grass," *Galium aparine*, L.,

growing locally in S.W. Kent, and more *Silene maritima*, With., in Romney Marsh than of late years. He reported the case of a Pike attacking a young Mallard.

Dr Cockayne then read extracts from his paper, "Hybrid Lepidoptera" (see *Trans.*). A considerable discussion ensued.

13th JULY 1939.

[Meeting held in the Rooms of the R.Ent.Soc., 41 Queen's Gate, S.W.7.]

The PRESIDENT in the Chair.

Mr M. Niblett exhibited many examples of Hymenopterous parasites which he had bred from plant galls, in illustration of his paper read subsequently.

Mr S. W. C. Williams exhibited larvae of *Cucullia chamomillae*, Schiff., taken at Bayford, Herts, 11.vii.39.

Dr Bull exhibited the flowers of *Bartsia viscosa*, L., and of "Yellow Loosestrife," *Lysimachia vulgaris*, L.; and a gall-producing fungus, *Protomyces macrosporus*, Ung., on *Oenanthe crocata*, L.

Mr J. O. T. Howard exhibited a specimen of *Ematurga atomaria*, L., a ♀ of the heather form from Berks, in which the outer cross-line was absent, and a similar specimen from the New Forest, with two ♀♀ of the chalk form from Kent for comparison.

Mr T. R. Eagles exhibited young larvae of *Palimpsestis or*, Fb., and also the large Rose Gall caused by *Rhodites rosae*, Htg. (Hym. Cynip.), from which there had emerged four examples of the gall causer and 96 specimens of various inquilines and parasites.

Mr F. D. Buck exhibited three specimens of *Strangalia (Leptura) quadrifasciata*, L., taken from a stump on Oxshott Common, 2nd July 1939. Altogether six specimens were taken from this stump. Further search in other stumps provided no more beetles but several larvae were found which may be the same, but as *Rhagium bifasciatum*, F., is very common in the district they may possibly be that.

Mr C. N. Hawkins exhibited a Dipterous parasite, *Carcelia rutilla*, B. & B., bred from a larva of *Bupalus piniaria*, L., taken at Oxshott, together with a puparium and the parasitized pupa of the host species.

Dr H. B. Williams exhibited (1) *Euchloe cardamines*, L., ab. *andromorpha*, Verity, 1911 ("Rhop. Pal.," 342). The specimen exhibited was taken by Mr H. Massey at Folkestone in 1901. The form is named by Verity, *loc. cit.*, who refers to a single specimen:—"La coll. Bang-Haas contient une ♀ de cardamines provenant de Petersdorf (Basse Autriche) qui est remarquable en ce que toute la partie de l'aile occupé chez le ♂ par la tache aurore est parsemée très légèrement d'écailles de cette couleur." Verity refers to his Pl. LXVIII, fig. 27, but the insect there figured is a ♀ of *Leptidea sinapis*, L. (2) *Hipocrita jacobaeae*, L., ab.

confluens, Schultz, 1908, "Ent. Zeits.," 1909, 184. Two examples. One bred 26th May 1939 from about 300 pupae resulting from a collection of larvae near my house at Bramley in 1938. The second, found in my garden, 3rd June 1939, no doubt resulted from a larva which escaped. (3) *Pieris rapae*, L. Examples bred May 1939, Bramley. A number of the ♂♂ have only one spot on the underside of forewings. A ♂ underside with a white area on outer margin of right hindwing. The specimens generally approach the summer brood, *aestivus*, Verity, in facies.

Dr E. A. Cockayne showed a long series of *Bupalus piniaria*, L., bred 1939, from Oxshott. It included males, one with pure white, two with deep orange ground, two with unusual extension of ground colour on forewings, two with ground colour restricted and heavily speckled, four with one or more wings bleached, four with ground colour of underside ochreous; females, four with pale bright fulvous ground colour contrasting with unusually dark apical and marginal markings, nine dull brown, darker than the usual northern form, two of them also ab. *strigata*, Dziur., and one dwarf. The most interesting is a crippled male with all the black scales replaced by pale grey. Three of this form were bred, but none was able to walk about or cling to the sides of the box. Placed in position they fell repeatedly, but one retained its hold long enough for its wings to expand partially.

Mr S. G. Wallis Norton exhibited a sample of insects taken during the day, at light and at sugar, in the Wyre Forest, Worcestershire, in early June 1939:—*Chlorissa* (*Nemoria*) *viridata*, L.—six specimens taken, mostly faded; *Abhras sylvata*, Scop.—very common; *Lithosia scroculula*, Hufn.—six specimens, mostly during the day; *Palimpsestis octogesima*, Hb.—four specimens at sugar; *Cerura furcula*, L.—one found at rest during daytime; *Acrionicta leporina*, L.—at sugar; *Palimpsestis duplaris*, L.—perhaps melanic, they came to light; *Dasychira pudibunda*, L.—several at light; *Hepialus humuli*, L.—several just at dusk; *Drymonia trimacula*, Esp.—almost a pest; *Eulype hastata*, L.—early afternoon, rather small dark specimens; *Cosymbia annulata*, Schultz—at light; *Plagodis dolabraria*, L.—several at light; and also a melanic form of *Cymatophora fluctuosa*, Hb., Ashdown Forest, of which there is no record in the "Supplement to Tutt's Variation of British Noctuae," and Dr Cockayne knows of no such form previously reported.

Mr Priske exhibited a specimen of *Helops laevioctostriata*, Göze (*striatus*, Fourc.) (Col.), with bifurcate antennae.

Mr H. Moore exhibited *Oötheca* of *Ectobius lapponicus*, L., and read the following note:—"While sugaring in his garden at Storrington, W. Sussex, Dr Robertson had several *Ectobius lapponicus*, Fab., visit his patch, 27.vi.39, of which he sent me one next day. A couple of days later extrusion of the egg purse commenced, and it was dropped 2-3 days later. The female died gradually the following day."

Mr M. Niblett then read his paper, "Parasites of Gall-causing Insects." (See *Trans.*)

27th JULY 1939.

[At the Rooms of the R.Ent.Soc. of Lond., 41 Queen's Gate, S.W.7.]

Dr E. A. COCKAYNE, Vice-President, in the Chair.

Dr Cockayne exhibited an example of *Miana versicolor*, Bork., from the Forest of Dean. This species has been recently added to the British List (see our *Proceedings*, 1937-8, p. 7), and its distribution here is practically unknown. Apparently it has a western habitat in this country.

Mr S. N. A. Jacobs exhibited an aberrant example of *Bupalus piniaria*, L., with the usual light areas much reduced on both fore and hindwings. Oxshott, 1939.

Mr J. O. T. Howard exhibited a number of moths bred from larvae collected in Delamere Forest at Easter, 1939. These included a series of *Triphaena fimbria*, L., dark green and dark brown forms; *Aplecta nebulosa*, Hufn., a dark grey form; *Noctua brunnea*, Fb.; *Cidaria truncata*, Hufn.; and *Boarmia repandata*, L., including a completely melanic specimen, ab. *nigricata*, Fuchs.

Mr E. E. Syms exhibited larvae of *Silpha thoracica*, L. (Col.), and parasitised ova of a species of Hemiptera found on an oak, from which the flies were just emerging.

Dr de Worms exhibited larvae of *Palimpsestis* or, Fb., *P. octogesima*, Hb., *Acronicta tridens*, Schiff., *Chlorissa* (*Nemoria*) *viridata*, L., and *Mysticoptera sexalata*, Retz.

Mr T. R. Eagles exhibited larvae of *Pterostoma palpina*, L.; and a "codlin moth," *Laspeyresia pomonella*, L., found in an apple box from British Columbia.

Mr L. T. Ford then gave an account of his experiences in "Breeding and Setting Micro-Lepidoptera," illustrating his remarks with some of the apparatus he used. (See *Trans.*)

10th AUGUST 1939.

Dr K. G. BLAIR, F.R.E.S., in the Chair.

The decease of Mr A. E. Tonge, who was Treasurer of the Society for many years, was reported.

The following were announced as being elected members of the Society:—Mr H. W. Forster, 76 Station Road, Chingford, Essex; Mr B. S. Doubleday, F.R.E.S., Monks Risborough, Aylesbury, Bucks; Mr P. Siviter-Smith, "Squirrels," Little Aston Park, Streetley, Staffs.

Mr A. Bliss exhibited specimens of ? *Zygaena meliloti*, Esp., from a new district in the New Forest; and *Hydriomena coerulata*, Fb. (*impluviata*, Hb.).

Dr G. V. Bull exhibited *Apamea gemina*, Hb., from Ryde.

Mr R. F. Haynes exhibited (1) larvae of *T. porcellus*, L., in their early stages, found at Seaford, Sussex, this season. (2) A rather strik-

ing aberration of *Abraxas grossulariata*, L., found wild on a garden fence in Dulwich. The black spots on the forewings were represented by smoky black bars on each wing interrupted by white patches. On the hindwings the black spots were in the form of a semi-circle; and (3) a gynandromorphic *Laotoë* (*Amorpha*) (*Smerinthus*) *populi*, L., bred from wild larvae found in Dulwich.

Preliminary Reports were read or given of the Field Meetings held recently: Darenth Wood, New Forest, Benfleet, Wendover, Clandon, and Box Hill.

In his Report of the Field Meeting held at Benfleet, 23.vii.39, Mr Attwood reported that a female "Oak Egggar" (*Lasiocampa quercus*, L.), which had emerged the previous day, was taken to Benfleet and created some interest by attracting ten males, seven of which were netted. The first male came flying around while the party was proceeding to the sea wall, and the female still in its box in the satchel. Three males were taken on the sea wall; they were in beautiful condition and evidently freshly emerged. Judging from our experiment, the sun has considerable effect in stimulating either the mysterious attractive power of the female and the "awareness" of the male. Whenever there was a short period of sunshine a male *quercus* would appear. South states that an empty satchel in which a female *quercus* had been confined had considerable attraction for some days, so it would appear that scent is one of the attractant causes. The attraction of three males to the sea wall from the usual *quercus* ground at Benfleet, about a mile away, on this scent hypothesis alone does not seem probable unless the female has some power by which she can disseminate or radiate this scent sufficiently strongly to overcome all intervening and crossing scents. The three males taken on the sea wall all came up against the wind and so did most of them on the usual *quercus* ground, but two came with the breeze. The wind is no doubt an aid to the distribution of the scent, call, or attractive power of the female, but in no case did the male go straight to the female as one would expect to be the case if following up a direct line. As soon as a male got within a certain distance he began quartering the ground until the female was found. The extent of this quartering varied considerably, possibly due to the rise and fall of the power emitted by the female.

Dr G. V. Bull recorded that: "On August 2nd I took a *L. trifolii*, Esp., ♀ down to Romney Marsh to assemble males. I left her in a gauze covered cage in my car while putting on sugar. On my return in about a quarter of an hour there was one ♂ flying about in the car. I took the cage and placed it on the shingle a few yards away and ♂♂ began to come up at once, but it was some minutes before the original ♂ could be induced to leave the car."

Dr H. King said: "In August 1930 I was collecting in the Lleyn peninsula with Mr R. E. Vaughan Roberts, a N. Wales entomologist, who found a newly emerged female *quercus* on a hedgebank. We took the female, in a card-board box with a muslin cover, by car to some

woodlands. During the journey I laid my net over the box and on arriving at our destination we placed the box on top of the car while we went into the woods collecting. I had not gone very far before a male *quercus* came flying around me persistently. Finally I netted it. On our return to the car the female had not attracted any males, although when taken back to the hamlet near where it was found it attracted a number of males later in the day. Evidently during the outward journey some of its scent got on to my net and when I went into the woods the wind facilitated the dispersal of the scent with result recorded."

Mr J. O. T. Howard said that: "In August 1937 I was staying in North Devon. One afternoon, while driving along a narrow lane near Hartland Point, I came on a swarm of a dozen or more males of *Lasio-campa quercus* circling around and around a stone gate-post, not ascending more than about ten feet or going more than about twenty feet away. On investigation, a ♀ was found, but she was already *in copula* with a ♂. Fearing that if fertilization was completed she would cease to be attractive, I separated them. However, the moment the pair came apart all the other males vanished. The ♀ was thus still calling vigorously although in the act of pairing, but ceased on separation, and did not call again."

The Chairman remarked that: "In the case of *Luciola italica*, L., one of the luminous beetles or fireflies, behaviour analogous to the sembling of *Lepidoptera* takes place, but here the attractive force is not scent, or something akin thereto, but light. As in the case of *Lepidoptera* he had noted that the attraction appears to be inoperative at very close quarters; a flying male attracted by a calling female alights within a few inches, but then apparently has some difficulty in locating her exactly."

24th AUGUST 1939.

Mr F. STANLEY-SMITH, Vice-President, in the Chair.

On behalf of Dr G. S. Robertson, Mr T. R. Eagles exhibited a specimen of the Longicorn beetle, *Prionus coriarius*, L., taken on an oak stump in the former's garden at Storrington, W. Sussex, 13.viii.39. It was noted that the larvae of this species feed in the roots of beech.

Mr V. E. August exhibited: (1) a ♂ Atlas Moth, *Attacus atlas*, L., bred from a larva found in a garden at Singapore; (2) *Melitaea aurinia*, Rott. (*artemis*, Fb.), bred from ova found in Buckinghamshire; (3) *Euchloris smaragdaria*, Fb., bred from ova found at the Field Meeting at Benfleet last year, 10.vii.38; and (4) *Melitaea cinxia*, L., taken at the Field Meeting on the Isle of Wight this year, 16.vii.39.

Mr D. H. Sterling exhibited larvae of *Platysamia* (*Samia*) *cecropia*, Cram., the Robin Moth of North America; also an adult larva of *Theretra* (*Metopsilus*) *porcellus*, L., which had retained the green colour

of the younger stages, with a typical larva for comparison. Both were from Mitcham, Surrey.

Mr C. N. Hawkins exhibited the larva of *Euclidia glyphica*, L., with a preserved larva of *E. mi*, Clrck., for comparison, and drew attention to the fact that *glyphica* has a pair of prolegs on the 4th abdominal segment, whereas *mi* has not. There are also differences in the respective colour patterns, particularly in the head.

Dr K. G. Blair exhibited: (1) An old gall of the beetle *Superda populnea*, L., from Oxshott, occupied by the Crabronid *Rhopalum clavipes*, L. When first found, on 15th July, the cavity of the gall was packed full of Psocids. These were of two species, *Amphigerontia bifasciata*, Latr. (three adults and one nymph), and *Elipsocus hyalinus*, Stephens (nineteen adults and eleven nymphs in various stages), all still alive but capable of only slight movements. In the process of counting them the egg of the Crabro was found attached to one of them. All were then replaced and the gall closed up. On 6th August it was reopened and found to be full of loose frass with the wings of the Psocids intermixed and in the middle of the mass the cocoon of the Crabro. (2) *Coccinella 7-punctatum*, L., from Wimbledon, with cocoon of Braconid parasite, *Dinocampus terminatus*, Nees, attached. (3) Egg-cocoon of spider, *Epeira* sp., with parasite, *Pimpla oculatoria*, Fab., reared from it. When first observed, on 17th July, there was a small dark-coloured larva among the eggs in one of the cocoons. On the 23rd the larva had spun its own cocoon and pupated, and the fly was out on 4th August.

Dr G. V. Bull exhibited a dark form of *Agrotis vestigialis*, Hufn., with lighter specimens for comparison.

Mr R. W. Attwood exhibited examples of *Melanargia (Satyrus) galathea*, L., from Benfleet, and pointed out one with the underside strongly suffused with bright orange yellow, the ♀ form known as ab. *flava*, Tutt.

Mr F. D. Buck exhibited a series of the Carabid beetle, *Brosicus cephalotes*, L., taken at Poole Harbour, 6.viii.39. These beetles make a short tunnel in the sand at the roots of Marram Grass and can generally be found sitting just inside the entrance with the tips of the antennae exposed. The most effective method of getting them out is to insert the finger vertically into the sand about an inch and a half behind the entrance of the tunnel, and the beetle will then run out.

Mr Hy. J. Turner exhibited a few kinds of unusually grown plants found in areas more or less desert in character, including several of that section of the Mesembryanthemums containing the dwarf so-called "Mimicry Plants," of which *Lithops pseudotruncatellum*, N.E.B., *Pleiospilos bolusii*, N.E.B., and *Conophytum elishae*, N.E.B., were members. The last named species was named in recognition of a well-known member of this Society some thirty years ago. These are found in the Karroo up to Namaqualand in S. Africa. Also two species of tropical succulents belonging to the *Crassulaceae*; *Echeveria paraguayensis*,

N.E.B., a most beautiful rosette-plant like a piece of choice china, from Northern S. America, and *Bryophyllum tubiflorum*, Haw., which bears small rooted offsets at the end of the spotted tubular leaves, from Africa. Also the pendulous plant, *Ceropegia woodii*, Schl., an Asclepiad from Natal, which has remarkable capped pitcher-like flowers.

Owing to the R.E.S. rooms being closed during the month of September and the darkened evenings no further meeting took place until the early afternoon of Saturday, 4th November.

4th NOVEMBER 1939.

Mr F. STANLEY-SMITH, Vice-President, in the Chair.

This meeting was held in the Chapter House of Southwark Cathedral in St Thomas's Street, Southwark. Some 60 members were present.

The Chairman explained that the main purpose of the meeting was to inspect and consider the suitability of the accommodation afforded by these premises as a new home for the Society; and to initiate a discussion to ascertain the feeling of the meeting on the Council's proposal to enter into an arrangement with the Cathedral authorities for permission to use these rooms as the Society's headquarters.

The general opinion being favourable, Mr Turner proposed that the Council's recommendation be accepted and that the final settlement be left to the Council. This was seconded by Mr Syms, and carried *nem. con.*

Various suggestions as to dates and times of future meetings were made, and it was finally left to the Council to arrange a programme.

The meeting then passed to exhibits.

Mr Wallis-Norton exhibited hibernating larvae of the Geometer *Hipparchus papilionaria*, L., from ova obtained from a female taken at Godstone. Also a series of *Lithosia griseola*, Hb., including ab. *flava*, Haw. (*stramineola*, Dbldy.).

Mr H. W. Andrews exhibited two local species of *Dolichopodidae* (Dip.), *Porphyrops antennata*, Carl., and *Thinophilus flavipalpis*, Zett., from N. Kent.

Mr F. D. Coote exhibited (1) a series of the Psychid *Taleporia pseudobombycella*, Hb., and read the following note:—"At the Field Meeting in Abbot's Wood, Sussex, last April, Mr Main found the cases with living full-fed larvae on trunks of a group of beech trees. Some authorities place this species and others similar with apterous females in the family Psychidae. But Meyrick places *Taleporia* (3 species); *Solenobia* (1 sp.); and *Luffia* (3 sps.) in the Tineidae. The four genera *Psyche*, *Fumea*, *Sterrhopteryx*, and *Epichnopteryx* (9 sps. in all) are in Psychina, with Zygaenidae, Procris, and Zeuseridae."

(2) Larvae, pupa-cases and imagines of *Comibaena pustulata*, Hüfn. (*Euchloris bajularia*, Schiff.) taken at the Field Meeting at Liphook this summer. The cocoon was formed within the oak bracts and the skin of the last instar.

(3) A photograph of one of the plants of the orchid *Epipactis violacea*, Bor., which he reported as finding on the edge of two small woods in West Sussex.

On behalf of Mr Frohawk, Mr Coote exhibited two examples of *Aglais urticae*, L., ab. *nigra*, Tutt, captured by Capt. Purefoy at East Farleigh in 1938 and 1939; *Euchloë cardamines*, L., ab. *maculata-punctata*, Tutt, ♀ Horsley 1892, ♂ Sussex 17.iv.39, and a gynandromorph from Swindon, 30.v.23; *Colias croceus*, Frery., ab. *pallida-obsolata*, Tutt, taken by Mr Frohawk at Broadstairs, 13.ix.28, and a . of *Polyommatus coridon*, Fb., taken at Worth, Dorset, by Mr Frohawk. (See Exhibition Report.)

Mr J. O. T. Howard exhibited two specimens of *Malacosoma castrensis*, L., one an inter-sex, ♀ in form but with the left antenna ♂ (recorded in the *Ent. Record* for October 1939), the other a ♂ ab. *pallida*, Tutt, both bred from larvae taken near Southend, and three ♀ forms of *Cosmotriche potatoaria*, L., bred from larvae taken on the St Ives sandhills, Cornwall.

Dr G. V. Bull exhibited a bred series of *Malacosoma castrensis*, L., from larvae obtained from a very restricted area in N. Kent. It included pale yellow forms without marking, a unicolorous ab. *pallida*, Tutt. Also the large Ichneumon *Rhyssa persuasoria*, L., parasitic on the timber-boring larvae of the Sawfly *Sirex gigas*, L.

Mr T. R. Eagles exhibited 57 parasites reared from a single ovum of the hawk-moth *Laotoë (Amorpha) populi*, L.; the beetle *Ptinus tectus*, Boi., which infested fish food; an imago of *Agrotis agathina*, Dup., bred from a larva swept from ling at the Witley Field Meeting, 1.iv.39; and a specimen of *Palimpsestis fluctuosa*, Hb., reared from a larva beaten out at the Tilgate Field Meeting, 18.ix.38.

Mr G. B. Oliver exhibited a ♀ specimen of *Colias croceus*, Frery., bred in May 1939, in which the forewings were typical *croceus*, while the hindwings approach those of the *helice*, Hb., and a ♀ form, of a purplish-grey shade, without trace of yellow, excepting the usual discal spots. Also varied underside colour forms of *Argynnis cydippe*, L., inbred from a Sussex variety strain, including auburn, buff, greenish, etc., and a male approaching the ab. *cleodoxa*, Och.

Mr E. E. Syms exhibited the rather local earwig *Apterygida albipennis*, Megerle, from Wye, Kent.

Mr S. Wakely exhibited a varied series of *Nonagria sparganii*, L., bred from larvae and pupae taken in the I. of Wight, and a yellow form of *Pieris napi*, L., from the strain bred by Mr Head.

Mr R. J. Burton exhibited larvae of *Perizoma taeniata*, Steph., from N. Lancashire.

Mr A. W. Buckstone exhibited several specimens of *Vanessa (Pyrameis) cardui*, L., having an additional subapical spot on each forewing. Bred from Isle of Wight ova, August 1939. Also the following *Polygonia calbum*, L. Five yellow specimens taken at Ashted, Surrey, July 1939. Two similar specimens bred from Bookham ova, June 1939. Three very

large dark forms with grey coloured margins to all wings. These were bred from Bookham ova, June 1939. Three specimens approaching *ab. hutchinsoni*, Robs., in the coloration of both upper and undersides of wings, bred from Bookham ova, September 1939. Two similar specimens captured at Ashted, September 1939. It should be stated, however, that only the ♂s approached *ab. hutchinsoni*, Robs., on both upper and undersides, the ♀s doing so only on the upper side. The undersides of this latter sex were of the usual nearly uniform black or brown. Individuals of this form were abundant in Ashted Woods during September and the first half of October this year, in fact, far outnumbering those of the typical (autumn) form. They are undoubtedly capable of hibernating, for fertile ova have been obtained from similar specimens in the early spring in previous years.

Mr Buckstone also exhibited a series of aberrations of *Polyommatus icarus*, Rott., including striate, dark, and pale undersides taken at Dorking, Surrey, in August; an example of *P. (L.) bellargus*, Rott., *ab. obsoleta*, Tutt, captured at Dorking, August 1939; and a very dark underside ♂ of *P. (L.) coridon*, Poda, taken in S. Sussex.

Mr S. P. Doudney exhibited a series of his captures in the Rannoch area of Scotland, not shown in his exhibit of 1938. There were included *Lophopteryx carmelita*, Esp., *Anarta melanopa*, Thnbg., *A. cordigera*, Thnbg., *Cidaria suffumata*, Schiff. (dark forms), *Lycia hirtaria*, Clrck., and *Isturgia (Fidonia) carbonaria*, Clrck.

23rd NOVEMBER 1939.

This meeting was held in the Crypt of the Chapter House.

The PRESIDENT in the Chair.

Mr L. Baker, Quarry Park Road, Cheam, was elected a member.

Mr O. J. Janson exhibited a male and female of the very beautiful and rare swallow-tail butterfly from the Island of Ceram, *Papilio stresemanni*, Roths., which is now considered to be only a form or race of the more plentiful *P. weiskei*, Roths.

Mr F. D. Buck exhibited the following four species of Staphylinid beetles:—*Xantholinus glabratus*, Gr. (three specimens), taken at Plaxtol, Kent, 12.xi.39, from a heap of cut grass. *Bryocharis cingulata*, Mn., a local beetle taken in Epping Forest, 29.x.39, from a piece of rotten wood that was saturated with water. Only two specimens were found. *Diagonium quadricorne*, K. (six specimens), two males and four females, from Hampstead Heath, 8.x.39. These specimens were taken under elm bark that had been tunneled by *Eccoptogaster scolytus*, Fr., a dead specimen of which was found in one of the tunnels. *Stilicis orbiculatus*, Pk., another rather local beetle taken at Plaxtol, 12.xi.39, in the same heap of cut grass as *Xantholinus glabratus*.

The following were appointed auditors:—Council, Mr F. D. Coulson; Ordinary Members, Mr F. D. Buck.

It was announced that the following members were elected on 24.x.1889 and thus had been with the Society for 50 years. They were heartily congratulated from the chair—Mr C. J. Wainwright, F.R.E.S.; Mr A. Ford; Mr W. Mansbridge, F.R.E.S.

9th DECEMBER 1939.

Meeting held at the Chapter House, Southwark.

Mr F. STANLEY-SMITH, Vice-President, in the Chair.

Dr K. G. Blair exhibited a series of *Cicindela campestris*, L., from the Sharp Coll. to show variation. An example of the var. *funebria*, Sturm., from the New Forest, 1910, was included, also some dark forms approaching var. *nigrescens*, Heer, from Scotland, and Freshwater, I.W.; also varieties with confluence or reduction of spots.

Mr F. D. Coote exhibited a living example of *Polygonia c-album*, L., from Cheam, Surrey.

The Baron de Worms exhibited four specimens of *Crymodes exulis*, Zett., f. *assimilis*, Dbldy. (three males and a female), and read the following note:—"Up to three years ago this Scottish form of the 'Northern Arches' moth was considered one of the rarest insects on our list. Previous to 1936 the majority of examples in any collection emanated from those taken at the end of last century regularly over a number of years, by a gamekeeper in the Rannoch area. On his death the secret of his locality went with him. Apart from his series a few sporadic specimens were taken in various parts of Scotland ranging from Aberdeenshire to the Isle of Arran and from Ross-shire in the north to Perthshire. In June 1930, Mr H. B. Lawson took a male on the wing in the daytime, the only occasion on which this phenomenon has been witnessed in this country, although this habit is common with its representatives in Iceland and Greenland.

"In August 1935, Mr Andrews secured a male at sugar near Loch Rannoch, and in the following season Messrs A. W. Hughes and Crewdson took one unexpectedly at light in another part of the same district. Revisiting the same spot in 1937, Mr Crewdson took five further males at light towards the end of July. At the same period I joined Dr H. B. Kettlewell in the locality where the gamekeeper had taken his original series forty years previously; Dr Kettlewell having re-discovered this by dint of much trouble and enquiry. The first time we tried this spot we took a male *assimilis* at light, while another appeared a few nights later.

"In 1938, this neighbourhood was visited by six collectors who obtained twelve *assimilis* during the first half of August.

"This year I thought I would try my luck again and joined Mr A. G. Russell at Rannoch at the beginning of August. After scouting around the district, we decided on a pitch where we had reason to believe some had been taken in the previous season. On our first attempt

we took a fresh male at sugar and finished up with no less than fourteen in five nights, securing five examples on one occasion under very cold conditions with a moonlit sky and an east wind. One of our specimens was a female of which very few are known; one had been taken at light in 1938 by Mr Demuth.

"From our investigations it would appear that this form of *exulis* has very much the same habits as its relatives in Shetland and elsewhere in the North. In Scotland it seems to inhabit only those areas where there is ample peat and where this is interspersed with heather and short grass, usually at an elevation of 800 to 1000 feet. I have little doubt that this insect is found over a wide range in Scotland wherever this type of terrain exists, since at the same period this year Mr Crewdson took a further dozen *assimilis* in quite a different part of Scotland, thereby bringing the total for the season up to between twenty-five and thirty. At Rannoch the optimum time of appearance of this form seems to be towards the end of July and in early August, whereas in the Shetlands early July is the best period as a rule. In the West of Scotland where the climate is milder it appears at the end of June. Now that so much more has come to light in recent years about this insect, I feel sure that it will be found in increasing numbers wherever it is looked for in its special type of habitat.

"The Scotch form is smaller and darker than the Shetland one and Seitz has classified it as a separate species, but this is open to question."

He also exhibited the following species obtained this season:—*Polyploca flavicornis*, L., melanic specimen with dark body taken at light near Ascot, March 1939. (Plate II.) *Taeniocampa populi*, Stroem (*populeti*, Tr.), male with pronounced row of black dots along the margin of the forewings (Kent, April 1939). *Cucullia gnaphalii*, Hb., male taken at light in East Kent, June 21st, 1939. Selection of series of insects taken in Scotland, August 1939:—*Agrotis cursoria*, Hufn., varied series from Forres. *Noctua depuncta*, L., from Forres. *Noctua castanea*, Esp., varied series from Rannoch and Aviemore. *Aporophyla lutulenta*, Bkh., f. *luneburgensis*, Frr., from Rannoch. *Plusia bractea*, F., from Forres. *Cosmia paleacea*, Esp., from Aviemore and Forres. *Crocallis elinguaris*, L., varied series from Aviemore. *Poecilopsis (Nyssia) lapponaria*, Bdv., from Struan, April 1939. From other parts of the British Isles:—*Diptera orion*, Esp., five examples taken at light on June 21st, 1939, in Kent. *Epunda lichenea*, Hb., series bred from a Swanage female. *Dianthoecia conspersa*, Esp., series from Clandon, Surrey.

Mr C. N. Hawkins exhibited comparative series of the Geometrid moth, *Nyssia zonaria*, Schiff., one from the Lancs. and Cheshire coasts and the other the result of inbreeding during 1937 and 1938 from eggs obtained from an Isle of Coll female. The Isle of Coll lies off the West coast of Scotland and forms one of the Inner Hebrides. Prof. J. W. Heslop Harrison has named the form of this species, which occurs in Coll, race *atlantica*, and says of it: "Racially, the insects are quite distinct from the English forms, for they are only two-thirds the size

and distinctly darker in the majority of cases." These claims are not borne out by the bred series, in which the insects are quite as large as those from the Lancs. and Cheshire coasts, and also as other specimens which I have from N. Wales. Moreover they are very variable in the shape and size of the dark markings and bands on the wings so that some specimens are quite pale in appearance. The ground colour also varies from pure white to a very pale buff.

Mr J. A. Downes exhibited a collection of Mecoptera obtained by him while in residence in N. America during the past year or two. It comprised species representing all families but one, most of them being native to that country.

Mr S. Wakely exhibited a series of the Pyrale, *Pyrausta nubilalis*, Hb., bred from larvae found in stems of *Artemisia vulgaris*, L., at Benfleet; also a living larva and portions of stems in which the larvae were found.

Mr E. E. Syms exhibited pupae of *Pieris brassicae*, L., to show colour variations, those collected from a white ceiling being light in colour and those from the mortar joints between red brickwork being dark, 50% of the light form were parasitized. They were collected at Woodbridge, Suffolk.

Mr Hy. J. Turner exhibited a series of selected examples of the yellow form of *Spilosoma lubricipeda* (1758) of Linné, i.e., *Spilosoma lutea* (1766) of Hufnagel. The series consisted of typical ♂ and ♀ *lutea* from S. London; a striated form, *eboraci*, Tugwell; 3 examples, co-types, of ab. *fasciata*, Tgw. l.; a trans ad *fasciata*, Tgw. l., in which the fascia was absent on the hindwings; the form *zatima*, Cram. (*radiata*, Haw.), in which all the veins were prominently white, with interspaces on forewing black, with the exception of 4 or 5 very pale areas, on hindwing grey-black; and a trans ad the all black form, *deschangei*, Dep. He stated that it was comparatively only a few years ago that it was noted that the *lubricipeda*, L., really included two separate species. Although this had been pointed out in 1766 by Hufnagel in the *Berlin Magazine*, where he named the first form (species), a white one, *lubricipeda-alba*, and the other, the yellow form (species), *lubricipeda-lutea*. Ignorant of Hufnagel's action, Esper, some twenty years later, called the white form *menthastri*, which redundant name has been used almost to the present time. The white form, being the first mentioned by Linné, must have the prior name *lubricipeda*, while the yellow form must take the name given by Hufnagel, viz., *lutea*, and *menthastri* must be dropped altogether. Linné gave references to two extremely good figures of the white and yellow forms given by Rosel a decade or so before 1758, which renders his meagre descriptions perfectly clear. References:—Linné, *Syst. Nat.*, Xed., 505 (1758); Hufnagel, *Berl. Mag.*, II, 412 (1766); Rosel, *Ins. Belust.*, II, plt. 46, f. 7-5, plt. 47 (1746?); Esper, *Abbild. Bombyx.*, III; Tugwell, *Ent.* (1894, p. 96, p. 205, fig. 4 (original description and figure of ab. *fasciata* by Tugwell)).

13th JANUARY 1940.

ANNUAL MEETING.

Dr H. B. WILLIAMS, F.R.E.S., President, in the Chair.

The Hon. Treasurer read his Annual Statement and submitted the Balance Sheet and Accounts, which were agreed.

The Hon. Secretary read the Council's Report, which was also passed.

The following is a List of the Officers and Council who were declared by the President duly elected for the ensuing year:—*President*—E. A. Cockayne, D.M., A.M., F.R.C.P., F.R.E.S. *Vice-Presidents*—H. B. Williams, LL.D., F.R.E.S., and J. O. T. Howard, M.A. *Hon. Treasurer*—T. R. Eagles. *Hon. Librarian*—E. E. Syms, F.R.E.S. *Hon. Curator*—S. R. Ashby, F.R.E.S. *Hon. Editor of Proceedings*—Hy. J. Turner, F.R.E.S., F.R.H.S. *Hon. Secretary*—S. N. A. Jacobs. *Hon. Minuting Secretary*—H. G. Denvil. *Hon. Lanternist*—J. H. Adkin. *Council*—F. D. Buck; G. V. Bull, B.A., M.B.; R. J. Burton, L.D.S., F.R.C.S.; F. D. Coote, F.R.E.S.; J. A. Downes, B.Sc., F.R.E.S.; F. T. Grant; F. Stanley-Smith, F.R.E.S.; G. R. Sutton; S. Wakely; The Baron de Worms, M.A., Ph.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C.

The President then read the Annual Address, in which he discussed in detail the Genus *Gonepteryx*, Leach, and illustrated his notes with a long series of coloured drawings and many examples from his own and other members' collections. (See below.)

Votes of thanks were then passed to the retiring President, Officers, and Council for their services during the past year.

A special vote of thanks was passed to Messrs S. R. Ashby, F. D. Coote, and F. J. Coulson for the great assistance given by them in the various removals and arrangements of the Society's effects from Hibernia Chambers to Store and from Store to the Chapter House, Southwark. This was carried with acclamation.

ORDINARY MEETING.

Dr E. A. COCKAYNE, F.R.E.S., President, in the Chair.

Mr F. D. Buck exhibited the Coleopteron, *Megatoma undata*, L., ♀ and larvae, and read the following note on the Biology of the species:—“While collecting in Epping Forest on 24.xii.39, Mr Forster and myself came across a standing tree (believed to be crab-apple), part of which had been attacked and burrowed by Hymenoptera, apparently some species of *Crabro*. In the burrows were found the remains of a number of insects (mainly Diptera). Among these were found the *Megatoma undata* and larvae. In every case the beetles were found lying in a cast larval skin. It seems that this species pupates within the old skin. As some ten or twelve beetles were taken like this I should think that in this case the beetles had emerged from the pupae in the autumn and if left undisturbed would probably have remained in a state of hibernation until the spring. Whether this is always the case is difficult to say because of the various situations in which the insect

occurs. According to Joy it feeds in old wool, old skins, etc., and bees' nests, while Fowler states that it feeds on hymenopterous pupae." Also exhibited were two specimens of *Stenus fornicatus*, Steph. This rather local beetle was taken from grass tufts in Epping Forest on 7.i.40.

Mr C. Down exhibited a few aberrations taken around Torquay, including minor forms of *Polyommatus coridon*, Poda, and pale examples of *Cosmotriche potatoria*, L.

The President's exhibit included:—A.—A long series of coloured drawings of species and forms in the genus *Gonepteryx*, Leach. B.—The following examples from his own collection:—1. *Gonepteryx rhamni*, L., from England; typical. 2. *G. rhamni*, from Spain, taken by Dr E. A. Cockayne, 1915 (costa of forewings more strongly arched at base, hindwings with rather more prominent "tooth," the ♂ deeper in colour, more particularly at base of forewings as far as discoidal spot). 3. Two ♂ *G. rhamni* from the New Forest with sooty suffusion at apex of forewings, both taken 2.vii.1903 by G. R. Baldock. 4. Two ♀ *G. rhamni*, ab. *intermedia*, Tutt, New Forest. 5. Two pale pinkish buff ♀ *G. rhamni*—(a) taken by H. B. Williams, Holmwood, Surrey, July 1917; (b) taken by J. P. Mutch, New Forest, 1890 [a similar one is figured by Mosley—vars. Brit. Lep., *Gonepteryx*, Pl. 1, fig. 4, from "Hornsey Wood"]. 6. Gynandromorph, *G. rhamni*, Briggs coll., figured in Rye's "Handbook," Pl. 7, fig. 5. 7. *G. rhamni* ♂, with red tips to forewings, taken by H. T. Payne at Walthamstow, in 1885, from the F. J. Hanbury coll. 8. *G. rhamni* ♂, stained red at anal angle of hindwings (caused by fluid discharged by imago on emergence).

Mr Hy. J. Turner exhibited examples of *G. cleopatra*, L., and ssp. *taurica*, Stdgr.; *G. farinosa*, Zell.; *G. aspasia*, Mén., and r. *acuminata*, Fldr.; *G. cleobule*, Hb., etc.

RECORDS AND FULL DESCRIPTIONS OF VARIETIES AND ABERRATIONS,

which would have been exhibited at the Annual Exhibition of the S. London Entomological Society, which latter could not be held owing to Hibernia Chambers being closed for rebuilding, and the Society's activities suspended until new accommodation had been found.

Compiled by Mr S. G. CASTLE-RUSSELL for publication in the *Entomologist's Record* and for the *Proceedings* of the Society.

Mr R. C. C. Lahey-Bean. *Argynnis paphia*, L., a gynandromorph, equally divided. R. side ♂, L. side ♀. New Forest.

Mr Percy M. Bright. *Polyommatus (Lysandra) coridon*, Poda, a fine example of ab. *ultraradiata* on a cream ground. ♂ underside. Sussex.

Col. V. R. Burkhart. *Aglaia urticae*, L. A ♂ aberration with costal blotches on the forewings united into a band; discal spots absent as in ab. *ichnusa*, Bon. Hindwings normal. Salisbury. *Plebejus argus*, L. (*aegon*, Schiff.). A ♂ upperside with blue forewings and black hindwings: underside grey. *P. (L.) coridon*. A series of underside aberrations including ♂ and ♀ ab. *caeca* (*Mon. Aberrations of L. coridon*, ♂, p. 44, plt. 10, f. 14; ♀, p. 83, plt. 16, f. 13), on white and on brown ground colour; ab. *obsoleta*, Tutt; etc. An upperside ♂ of olive-green colour, ab. *ultra-viridescens* (*l.c.*, p. 10, plt. 1, f. 24) and ♂♂ ab. *fowleri*, South (*l.c.*, plts. 3, 5, 10, 11, 16). Wilts and Sussex.

Mr J. C. B. Craske. *P. (L.) coridon*. Aberrational forms including: an extreme form of the ♂ with 3/4ths of the wings suffused with black similar to ab. *melaina*, Tutt, but of different shades of colour (*l.c.*, p. 11); ♂ examples of ab. *pulla* (*l.c.*, p. 28); ♂ examples of ab. *cinnamomeus*, (*l.c.*, p. 11, plt. 1, fig. 5; plt. 3, fig. 15); other colour forms including an extreme of ab. *marginata*, Tutt (*l.c.*, p. 15, plt. 3, f. 3; plt. 5, f. 10), etc. Dorset and Sussex.

Mr J. C. Farwell. *Argynnis paphia*. Two of exactly halved gynandromorph examples. Both New Forest. L. side ♀ in each case.

Mr T. W. Jefferson. *P. (L.) coridon*. A series of upperside aberrations including ♂ ab. *melaina*, with 3/4ths of the wings black; a ♂ ab. *pulla*; a ♂ ab. *caeruleo*, Tutt; a ♂ of green-olive colouring, ab. *ultra-viridescens*; a form with long white stripes on the L. underside wing; an extreme example of ab. *inaequalis*, Tutt, L. side ♀ colour brown, R. side mostly of *syngrapha* blue colour with several dark streaks of normal brown on fore and hindwings, R. side wings slightly the smaller. Dorset and Sussex.

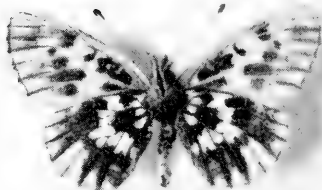
Mr E. E. Johnson. *Aglaia urticae*, L. A very fine example of ab. *nigrocaria*, de Moff. On the upper side the costal blotches on the forewings are united, forming a heavy black bar; the central spots are pre-

sent, but the two outer ones absent as in ab. *ichnusa*; on the apices are large areas of lilac and straw colouring. Hindwings entirely black except for a faint reddish tinge in the discal areas, and a basal border of prominent lilac blue spots. Under side normal except that the blue border-spots are unusually prominent. Wiltshire. *Thecla quercus*, L. An example of large size of ab. *bellus*, Gerh. (orange markings on upper-side forewings on a blue ground). New Forest. *Aphantopus hyperantus*, L. A ♂ example of ab. *lanceolata*, Frohawk, and a ♀ with a number of small additional spots on underside of forewings.

Mr E. C. Joy. *Polyommatus icarus*, Rott. A remarkable ♀ form in which the upperside has large faint mauve lunules on a wholly brown ground, which is peppered all over with male blue scales, most prominently at apices and margins. There is an iridescent effect as in *Apatura iris*, L.

Captain C. G. Lipscombe. *Brenthis euphrosyne*, L. A ♂ example suffused with black on the upper-side forewings. Somerset. *P. icarus*, Rott. A series of ♂ and ♀ examples from the North Coast of Scotland showing them to be a race intermediate in appearance between the brilliant Irish single-brooded form and the normal English typical form. *P. (L.) coridon*. A series of aberrations including ab. *pulla*, f. *syngrapha*, and spotless underside forms. Wilts and Sussex.

Rev. J. N. Marcon. (Plate II.) *Brenthis euphrosyne*, L. A ♂ of creamy ground colour; a ♀ with the basal blotch medium band thickened and placed further towards the margin than usual, with the intervening space obsolete save for one costal spot. A ♀ with outer spots united in pairs. Sussex and Surrey. *A. hyperantus*, 2 ♂♂ with a smoky suffusion over the undersides, tending to obscure the white dots and making the yellow rings blurred and indistinct; a ♂ upperside of a silky black instead of the usual shade, the L. hindwing underside has the area from the base extending two-thirds towards the outer margin jet black with nervures clearly marked in yellow, this area bounded by yellow border; the jet black displaces the yellow and black-ringed eye-spots, leaving only the white dots. These insects were taken in Surrey in July within 20 yards of each other, and the last is perhaps an example of melanism affecting the upperside and in this case "spreading through" to the underside. The fact that examples of ab. *caeca*, Fuch, are fairly common in the area would show how persistent are the white dots. More often than not ab. *obsoleta*, Tutt, is the result of keeping *caeca* in the cabinet for a long period, with consequent fading out of the obscure white dots. All from Surrey. *P. (L.) coridon*, a series of upper-sides including ♂♂ and ♀♀ of ab. *fowleri*, ab. *pulla*, ab. *glabra*, ab. *albomaculata*, ab. *ultra-iridescens* (olive-green); a series of under-sides including a ♀ of dull steel colour, uniform and obliterating the normal row of fulvous spots; a ♂ under-side *ultra-radiata*, on the forewings 5 stripes, the longest being the bottom one, and on the hindwings 8 stripes, on each uniform and symmetrical; the submedian spots on the hindwings are elongated giving a striking appearance to



ABERRATIONS OF
Aphantopus hyperantus, L.
Argynnis aglaia, L.

Melitaea athalia, Rott.
Brenthis selene, Schiff.

Brenthis euphrosyne, L.
Brenthis selene, Schiff.

the insect; the outer border spots are so faint as to be almost obsolete; actually the only normal spots on the underside are the discoidal on the forewings. The example is of large size and was captured shortly after emergence. The ground colour is strongly whitish. (Mr Castle-Russell says that this remarkable specimen is one of the most extreme that he has seen exhibited or figured.) A truly halved gynandromorph, R. side ♂, L. side ♀, the body is also exactly halved; a gynandromorphic example, L. side ♂, R. side largely ♀, with a small streak extending half way along the costa of the forewing, and three streaks near the anal angle of the hindwing of male coloration; a ♀ underside of dull steel coloration, uniform and obliterating the normal row the fulvous spots.

Mr P. Nagle. *Brenthis euphrosyne*, L. A ♀ with the forewings spotless except, spots in each discoidal area and confluent border spots. The hindwings are wholly black except for a basal border of straw-coloured spots. N. Forest; a ♂ specimen with the forewings heavily suffused with black, hindwings also black with yellow spotted basal border. N. Forest.

Mr L. W. Newman. *Gonepteryx rhamni*, L. A gynandromorph, R. side hindwings pure ♂, left side pure ♀. On both forewings the sexual coloration is mixed. Bred, Bexley. *P. (L.) bellargus*, Rott. A ♀ with forewings underside ab. *obsoleta*, Tutt, and hindwings ab. *striata*, Tutt; a ♂, underside white ground ab. *caeca*, Tutt. *Lasiocampa quercus*, L. A fine series of the ab. *olivescens*, form of the var. *callunae*, Palmr. race. *Pieris napi*, L. A short series of fine dark Caithness forms.

Mr G. B. Oliver. *Colias croceus*, Fourc. A bred ♀ upperside, forewings normal, hindwings purplish grey, much deeper than the darkest forms of *pallida*, Tutt, or *helice*, Hb., with the usual discal orange spots, fringes from yellow to red, margin typically black bordered with purplish grey. A remarkable form. *Argynnis cydippe*, L. (*adippe*, L.). An underside approaching form *cleodoxa*, Och., the metallic spots only partly and dully silvered. Sussex and Bucks.

Major-General A. L. Ransome. *B. euphrosyne*. A ♀ example with more or less spotless forewings, except for disconnected border spots, hindwings wholly black except for basal border of pale yellow spots. New Forest. *P. (L.) coridon*. A series of aberrations including ab. *caeca*, ab. *obsoleta*, ab. *fowleri*, etc.

Mr S. G. Castle-Russell. *B. euphrosyne*, L. A ♀ with unusually wide black borders to all four wings; Surrey. *A. cydippe* (*adippe*), a ♂ with the black markings on the forewings considerably extended and joined together; an underside with the marginal spots on the hindwings fulvous, instead of silver; a series of undersides with the spots on the forewings extended into streaks. *A. paphia*, a ♂ upperside with 2 large metallic spots on each hind wing in the inner margin. *Euphydryas (Melitaea) aurinia*, Rott. An extreme melanic ♀ upperside form in which both fore and hindwings are wholly black except for several small faint fulvous markings; on the underside the ground colour of all the wings is fulvous and without markings except for a broad band

of blackish colour at the base of the hindwings, bred at Highcliffe, Hants; a melanic ♀ form in which the forewings are entirely black except for small fulvous areas in the disc; there is also an inner border of pale straw-coloured spots in close connection with a row of marginal outer red spots, the hindwings are also black with several small fulvous areas and a basal border of red spots; on the underside there are 3 large black blotches replacing the normal spotting; Highcliffe, Hants. A ♀ upperside with two rows of yellow spots connected together, forming long rays; Highcliffe. The above exceptionally extreme specimens were amongst the last dozen to emerge from some 1500 pupae. The entire brood was unusually healthy and free from disease and parasites; with the exception of those described the whole of the rest were severely typical. The larvae were kept continually in the open and subject to all weather conditions. *P. (L.) coridon*. A ♂ example of the very rare ab. *auronulla* (l.c., p. 30, pl. 4, f. 10) in which the marginal spots on the underside are entirely devoid of colour. In addition, this example has black chevrons above the marginal spots on the hindwings; another very rare ♂ form, *tri-I-nigrum* (l.c., p. 36) with 3 elongate streaks beneath on the forewings; a curious example of ab. *cacca* with ♀ coloration but with distinctly ♂ body: possibly gynandromorphous; a short series of ab. *syngrapha*, Tutt, from Salisbury; a series of upperside ♂ forms, very pale forms, and ab. *cinnameus* (l.c., p. 11, pls. 1, f. 5 and 3, f. 15). Sussex and Wilts. *Eumenis (Hipparchia) semele*, L. A ♂ upperside with 4 large spots on the forewings instead of the normal 2, and 3 on the hindwings in place of the typical one. Sussex.

Mr Harold Smith. *Plebejus argus (aegon)*. A ♂ specimen in which all four wings are black, with grey underside; a gynandromorph, R. side ♀, L. side ♂. Surrey.

Mr Norman Watkins. *Aglais urticae*. A ♂ with wholly black hindwings; on forewings the costal blotches are united by greyish black smears, the typical central spots are absent; Wilts. *Brenthis selene*. A ♂ upperside, the outer borders on all four wings are elongated into streaks, with the exception of the discoidals, the central and basal areas are devoid of spots.

Mr Douglas Watson. *Argynnis cydippe (adippe)*. A ♂ with connected and extended markings on the forewings upperside. New Forest.

Colonel L. Wood. *Vanessa (Polygonia) c-album*, L. A ♂ with coalesced markings on the forewings, the hindwings suffused with black and without basal spots. Wilts.

Mr N. G. Wykes. *Apatura iris*, L. A short series bred from Surrey larvae. *P. argus (aegon)*. A series of the chalk form *cretacea*, Kent. *Aricia agestis*, Schiff. (*medon*, Esp.), (*astrarche*, Brgstr.). A form with underside marginal spots missing and tending towards a sagittate appearance; Aldershot. *P. (L.) coridon*. A series of aberrational forms including ab. *obsoleta*, forms of *syngrapha* with varying ground colour and width of marginal darkening; Cotswolds.

Mr H. A. Leeds captured at Wood Walton, Hants, a *Coenonympha pamphilus*, L. ♀ underside with one large and other small patches of fulvous on the R. hindwing = post-dex-homoeosis, 28.viii.39; also *Strymon pruni*, L. ♀ upperside with the forewings suffused inwardly with fulvous spreading from the large normal fulvous patches = *anti-fulvior*, Tutt.

Mr Hy. J. Turner. The second sample of common *Rhopalocera* sent to him from Manchuria, the centre of origin being the town of Harbin. Like the previous sample received, the predominance of the Palaearctic Fauna is quite obvious.

Papilio machaon, L., may be placed as f. *asiaticus*, Mén., in which the black pigment is stronger, the cell of the hindwing almost touches the hind marginal band and compared with British examples the ground is definitely deeper in colour. *Parnassius stubbendorffii*, Mén., a species without marking, comparable to *Aporia crataegi*, L. Far Eastern *P. nomion*, Fisch., has resemblance to *P. apollo*, L., but the texture of the wing surface is vitreous, the hindwings are much more marked and the border marking is broken into rough chevrons. An Eastern Himalayan species. *Aporia crataegi*, L., of good size, fairly common. *Pieris rapae*, L. The specimens were rather small but much dark suffusion spread from the base. Possibly a small example of f. *crucivora*, Btlr., which is a large form, or a small form of *orientalis*, Oberth., with less developed marking. *Pieris napi*, L., possibly a small *orientis*, Obthr., but beneath like ab. *napaeae*, Esp., and called *heptapotomica*, Krulck. The upperside is very dark along the veins. *P. melete*, Mén., a large species with a soft mealy surface; markings prominent, spotting like that of *brassicae* but softer, and more diffuse. Occurs further West. *Leucochloë daplidice*, L., quite comparable with specimens of S. Europe. *Midea scolymus*, Btlr. An Eastern species with falcate wings. China and Japan. *Gonepteryx rhamni*, L. Specimens of a richer colour than British examples, the ♀ has stronger coloration, race *amurensis*, Graes. *Colias hyale*, L. The local race is a large form, *poliographa*, Mén., but the specimens received are the small spring brood; the ground colour is a stronger yellow. *Leptosia amurensis*, Mén. This species is much larger than our *sinapsis*, but those received are small. The species has pointed forewings, rather long and narrow. Of the above species 6 are indigenous in Britain; only 3 are really Eastern, the remainder are closely allied to or are European species.

The *Satyridae*. Five species were received. *Lethe epimenides*, Mén., about the size of British *semele*, sits on trunks of trees and is common. *Ypthima baldus*, Fb., one of the commonest smaller East Asiatic butterflies, sits several on a leaf at one time. It is most variable in the number of ocelli on the hindwing beneath, from 6 to 1. The apical ocellus has two white pupils. *Satyrus (Melanargia) halimede*, Mén., a somewhat smaller species than our British *galathea*. The S. China form is much larger. It is really an outlying species of a genus mainly confined to the Mediterranean countries. *Oeneis urda*, Er. A

small obscure-looking insect of northern affinities, common in the Amur area. *Satyrus dryas*, Scop., f. *bipunctatus*, Molsch., is a small and very black race of a common alpine and widely distributed species. The ocelli are present but strongly obscured by the deep black ground colour.

Of the *Nymphalidae* there is *Apatura ilia*, Schiff., a species which occurs from Northern France to the Amur and Japan. The local form is *substituta*, Btlr., generally darker ground colour, and whiter band, etc., on the underside. *Neptis coenobita*, Stoll. (*lucilla*, Fb.); an East European species. The local form is *magnata*, Heyne, with increase of white marking and paler brown underside. *Neptis alwini*, Brem. & Gray. A Chinese species. *Vanessa io*, L., ssp. *geisha*, Stich., deficient in blue scaling in the apical ocellus and brighter yellow patches on the forewings. *Polygonia c-aureum*, L. A far Eastern species somewhat larger than our *c-album*, darker above with less irregularly margined wings and a more uniform light brown below. *Araschnia burejana*, Brem. A far Eastern species allied to the Central European *A. levana-prorsa*, L. It is somewhat larger than that species, but resembles it in general appearance and in its line of variation. *Melitaea aurinia*, Rott., ssp. *mandchurica*, Stdgr., much larger than Western Palaearctic forms, with uniformly reddish yellow ground. *Melitaea didyma*, Ochs., f. *mandchurica*, Seitz. Forewing more elongate and pointed, hindwings of ♂ almost markingless with broadish black margin; ♀ strongly spotted with black. *Melitaea athalia*, Rott. A small specimen, possibly of race *niphona*, Btlr. *Melitaea dictynna*, Esp., race *erycina*, Stdgr. Above very like European specimens, but beneath more variegated and slightly smaller. *Brenthis selene*, Schiff. Small, paler than British examples, with more and somewhat stronger silver spots. *Argynnis laodice*, Pall. A species ranging from Eastern Germany to Japan. Larger than the European form and probably f. *ariana*, Fruh. No "blues" or "skippers" were received. But there was a good sample of common *Heterocera*, mainly true Palaearctic species.

Mr F. W. Frohawk. A gynandromorph of *Euchloe cardamines*, L. R. side ♂, left side ♀. Swindon, 3.v.1933; ab. *macula-punctata*, Froh. ♀ in which there occurs a row of punctate black spots on the margin of the hindwings at the termination of the nervures, vi.1892. Horsley, Surrey. *Colias croceus*, Fourc. ♀ ab. *pallida-obsolata*, Froh., 13.ix.1928, in which the extreme white form named *pallida* by Tutt is united with the form of female with obsolescent marginal spotting in the margin. Broadstairs. *Aglais urticae*, L., 2 ♀♀ of ab. *nigra*, Tutt, with entirely black hindwings. East Farleigh, Kent. (1) 2.x.1936; (2) 2.ix.1939, both caught by Captain E. B. Purefoy in his garden within 5 yards of each other but 3 years between.

Mr H. O. Wells. *Polygonia c-album*, L., in which the hindwings are entirely black. Wye Valley, 1939. *Argynnis paphia*, L. A form with large whitish spots on each forewing. Wye Valley, 1939. *Maniola (Epinephele) jurtina*, L. (*janira*, L.). Aberrations from the Wye Valley and Eastbourne at which last place the species were swarming on the

Downs at the end of August. *P. (L.) coridon*. A good series of minor aberrations from Herts and Sussex and 1 ab. *fowleri* from Sussex. *Coenonympha pamphilus*, L. A form from the Wye Valley with large white blotches on each of the hindwings.

Mr Leonard G. Hulls. A long bred series of *Manduca (Acherontia) atropos*, L., from West Sussex, 1938. A series of teratological specimens of this species illustrating various forms of deformity. A painting by Mrs Hulls of a brown form of the larva taken in W. Sussex, October 1939. Living specimens of the S. African Phasmids, *Phalces longiscaphus*, and of *Macynia labiata*, reared on bramble, from ova sent by Dr Le Peuvre from the Cape. Examples of the ♂ of the Phasmid *Carausius morosus*, reared during 1939.

Mr S. Wakely. Species bred by him during 1939. *Nonagria sparganii*, Esp. (The Wilderness, Isle of Wight); *Boletobia fuliginaria*, L. (Berkshire); *Salebria obductella*, F.R. (Kent); *Alispa angustella*, Hübn. (Mickleham, Surrey); *Epischnia banksiella*, Rich., and *Euzophera cinerosella*, Zell. (Portland, Dorset); *Homocosoma binaevella*, Hb., and *H. saxicola*, Vghn. (Compton, I.W.); *H. cretucella*, Rössl. (Gurnard, I.W.); *Eurhodope marmorea*, Haw. (Niton, I.W.); *Pyrausta nubilalis*, Hübn. (Benfleet, Essex); *P. asinalis*, Hb. (Portland, Dorset); *Trichoptilus paludum*, Zell. (Pardy Heath, Dorset); *Pterophorus osteodactylus*, Zell. (Grange-over-Sands, Lancs.); *Agdistis statices*, Mill. (Portland, Dorset); *Phalonia implicitana*, Wocke (Gurnard, I.W.); *P. flaviciliana*, Wilk. (Coulsdon, Surrey); *Euxanthia aeneana*, Hübn. (Benfleet, Essex); *Evetria purdeyi*, Durr. (Gurnard, I.W.); *Eucosma aemulana*, Schläg., and *E. trigeminana*, Steph. (Benfleet, Essex); *Hemimene aeratana*, Pierce (Bexley, Kent); *Enarmonia conicolana*, Heylaerts (Holmsley, New Forest); *Phthorimaea obsoletella*, Fisch. v. Rösl. (Upper Norwood, London); *P. acuminatella*, Sirc. (Reigate, Surrey); *P. fraternella*, Dougl. (Upper Norwood and Horsley, Surrey); *Thiotricha subocellea*, Steph. (Coulsdon, Surrey); *Telephila schmidiella*, Heyd. (Boxhill, Surrey, and Niton, I.W.); *Brachmia rufescens*, Haw. (Dorset); *Mompha schrankella*, Hübn. (The Wilderness, I.W.); *Depressaria umbellana*, Steph. (Gurnard, I.W.); *D. putridella*, Schiff. (N. Kent); *D. purpurea*, Haw. (Kent and I.W.); *Stephensia brunnichella*, L. (Coulsdon, Surrey, and Eynsford, Kent); *Elachista magnificella*, Tengst. (Bexley, Kent); *E. cinereopunctella*, Haw., and *Eupista potentillae*, Staint. (Riddlesdown, Surrey); *E. badiipennella*, Dup. (Benfleet, Essex); *E. hemerobiella*, Scop. (Dartford, Kent); *E. ochrea*, Haw. (Niton, I.W.); *E. vibicella*, Hübn. (Gurnard, I.W.); *E. discoidella*, Zell. (Chesil Beach, Dorset); *E. inulae*, Wocke (Gurnard, I.W.); *E. tripoliella*, Hodgk., and *E. argentula*, Zell. (Benfleet, Essex); *E. crigerella*, Ford (Gravesend, Kent); *E. obtusella* (Benfleet, Essex); *Gracillaria auroguttella*, Steph. (Coulsdon, Surrey); *Phaulernis dentella*, Zell. (Riddlesdown, Surrey); *Tischeria complanella*, Hübn. (Holmsley, New Forest); *Meessia richardsoni*, Wals., and *Teichobia verhuellella*, Staint. (Portland, Dorset); and *Nemotois scabiosella*, Scop. (Coulsdon, Surrey). Other species which had been

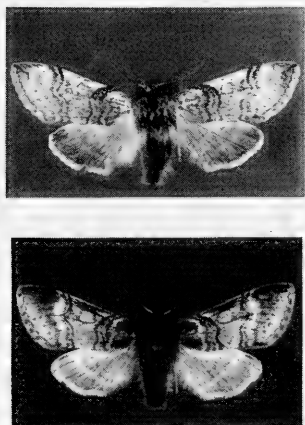
captured as imagines were: *Setina irrorella*, L., and *Psammotis hyalinis*, Hübn. (Mickleham, Surrey); *Platytes cerussella*, Schiff. (Niton, I.W.); *Hysterosia inopiana*, Haw. (Gurnard, I.W.); *Thiotricha suboccella*, Steph. (Niton, I.W.); *Eupista frischella*, L. (Faversham, Kent, and Gurnard, I.W.); and *Eidophasia messingiella*, Fischr. v. Röslr. (Faversham, Kent).

Baron de Worms. A few examples of the form *assimilis*, Dbldy., of *Crymodes exulis*, Lef., which is a deeper dark brown than the type, with slight purple flush. Rannoch. *Polyploca flavicornis*, L. (Plate III), a ♀ with melanic body and thorax and with unusual and extended dark markings on the wings. Ascot, March 1939. *Taeniocampa populi*, Strm. (*populeti*, Fb.), with a very pronounced row of spots on the forewing marginal area. Ashford, Kent. *Cucullia gnaphalii*, Hb., a specimen taken at light, 21st June. Kent. *Crocallis elinguaris*, L., a varied series from Aviemore, some with cross lines absent. Numerous other species and local forms especially from Aviemore, Rannoch, and Forres, from which last place the sandhill forms of *Eumenis semele*, L., and *Agrotis cursoria*, Bork., were obtained, and *Poccilopsis (Nyssia) lapponaria*, Bdv., from Struan, Perthshire.

ADDENDA.

Mr B. M. Morley. (a) *Cucullia gnaphalii*, a ♂ taken 17.vi.39 flying at dusk close to a small willow bush; I think it was after honeydew. (b) *Aplasta ononaria*, five specimens bred from 29.vi.39 to 17.vii.39 from larvae found in May and June in the Warren, Folkestone. The example bred 29.vi.39 is without doubt the first specimen bred from a British larva.

Mr J. Anthony Thompson. *Maniola (Epinephele) jurtina*, L. ♀. Forewing creamy-white to the border which is of the normal fuscous. The orange patch of the forewing is present, and the eye-spot greatly reduced on the left side but normal on the right side. The specimen was drying its wings when captured. South Devon, August 1939.



DESCRIPTION OF AN ABERRATION OF *POLYPHOCA FLAVICORNIS*.

Taken by C. G. M. DE WORMS.

Figure B. shows a very unusual female example of the "Yellow-horned moth" which came to my car headlights on 20th March 1939, near Ascot, Berks. Its chief abnormal features are the melanic body and thorax, together with the blackish bands running from the apex of the forewings and also the dark markings at their base and along the costa. It is possible that this type may be unique so far as this country is concerned. For comparison a normal specimen of the southern form of this species is given (Figure A.). Mr W. H. Tams of the British Museum (Natural History), very kindly carried out the photographs.

REPORTS OF FIELD MEETINGS.

15th JANUARY 1939.

VISIT TO TRING MUSEUM.

Leader: Mr F. D. COOTE, F.R.E.S.

This Museum is not open to the public on Sundays, but Dr K. Jordan very kindly arranged to show members of the Society some of the treasures there on the above date.

About 24 members arrived at Tring at midday and proceeded to the Reservoirs at Wilstone and Marsworth. It will be remembered that during the previous summer the Little Ringed Plover (*Aegialitis dubia*, Scop.) successfully nested there, the first time on record in this country.

On the occasion of the Society's visit the weather was dry with intermittent sunshine, but with a strong wind. A large number of Mallard (*Anas platyrhynchos*, L.), Tufted Ducks (*Nyroca fuligula*, L.), and Teal (*Querquedula crecca*, L.) were seen, as also a pair of Smews (*Mergus albellus*, L.) and four Goosanders (*Mergus merganser*, L.). Some of the members found empty pupa cases of *Nonagria geminipuncta*, Hatch, and two beetles.

Other members and friends arrived at Tring later in the day and shortly after 2 p.m. the party, numbering over 40, entered the Museum. Dr Jordan first conducted them through the public galleries, drawing attention to the many rare animals and birds, explaining the various characters of the different groups. Particular notice was taken of the Okapi, Giant Panda, and Giant Lizard. In the private rooms many drawers of very interesting Lepidoptera were exhibited, including instances of polymorphic Papilios and of Mimicry. Special interest was taken in the British collection, containing very many rare varieties, such as the black *Papilio machaon*, L.

Mr Stanley-Smith, the President, expressed the thanks of the Society to Dr Jordan for kindly arranging the visit and giving up his time to conduct the members through the Museum.

Thirty-five members and friends then adjourned to the Rose and Crown for a very excellent tea. Those returning to town by train had an enjoyable walk to the station, beguiling the 20 minutes to spare by discussing in the warm waiting-room the evolution of *Homo sapiens*.

25th MARCH 1939.

FIELD MEETING—EFFINGHAM.

Leader: Mr T. R. EAGLES.

Six members only attended this meeting; the weather was most unpromising.

The party spent the afternoon in the pine wood towards Ockham. There were unusually few insects (whether larvae or imagines) on the pines. The only lepidopterous larvae were *Ellopiia fasciaria*, L. (*pro-sapiaria*, L.), *Thera obeliscata*, Hb., *Arentia flexula*, Schiff., and *Cedestis farinatella*, Dup. No beetles of note were seen. Of other Orders the following representatives were observed:—

NEUROPTERA:—Larvae of *Raphidia notata*, Fab.

CORRODENTIA:—*Elipsocus westwoodi*, McLachlan.

HOMOPTERA:—*Psyllidae*—*Psylla nigrita*, Zett. (*pineti*, Flox.).

By sweeping the heather a good number of half-grown larvae of *Perconia strigillaria*, Hb., and some very small larvae of *Agrotis agathina*, Dup., were secured.

Apart from *Chimabache fugella*, Fabr., the only imagines about seemed to be *Polyplocia flavicornis*, L., *Pachynemias hippocastanaria*, Hb., and the ash-feeding microlepidopteron, *Zelleria hepariella*, Staint.

A small Phytophagous beetle found on the birches near the edge of the wood proved to be *Phyllotreta consobrina*, Curt.

The conditions were so unsuitable for night collecting that the party made for home after taking tea near Effingham Junction Station.

1st APRIL 1939.

FIELD MEETING—HAMBLEDON COMMON, WITLEY, SURREY.

Leader: Mr F. D. COOTE, F.R.E.S.

The season being very backward and the weather unpropitious, only four members attended this Field Meeting, which had been arranged mainly to work the tallows in the evening. Our small party arrived at Witley shortly before 3 p.m., and proceeded to Hambledon Common. Although the area is not extensive there is a good assortment of trees, such as alder, tallow, buckthorn, pine and oak. A boggy stream crosses one corner and birch trees are dotted among the heather in the higher part.

Very few insects or larvae were taken, an unexpected thunderstorm sending us to Harriers' Inn for tea earlier than originally proposed.

The rain after tea showing no sign of abatement, all except one who decided to work the tallows returned home by an early train.

16th APRIL 1939.

FIELD MEETING—ABBOT'S WOOD, SUSSEX.

Leader: Mr R. F. HAYNES.

Five members travelled down to Polegate on the S.R. Ramblers' comfortable electric train. On arrival at Polegate, the party was joined by another member and the curator of the Bexhill Museum.

The morning was very windy, cloudy and cold. Soon after entering the woods, a large number of Psychid cases were found on tree trunks.

Beetles were fairly numerous and a list of the more noteworthy species taken by Mr F. D. Buck is appended below.

The weather brightened up slightly in the afternoon. An imago of *Ectropis (Tephrosia) crepuscularia*, Hb., was found on a tree trunk and later one lepidopterist was successful in discovering a young larva of *Limenitis camilla*, L. (*sibilla*, L.) on honeysuckle. The attention of members of the party was drawn to a large fox in the sparse undergrowth at the side of a ride in the wood. The animal was not more than 15 yards away and was so engrossed in its own business that it was quite unaware of its being observed until it was startled by voices.

Many large nests of the wood ant (*Formica rufa*, L.) were seen along the sides of the path. Just before leaving the wood, on some sandy soil, the curator amused the party by pushing a thin stick into small holes in the ground and adroitly drawing up larvae of the tiger-beetle (*Cicindela campestris*, L.).

Tea was taken at a roadside café near Hailsham, after which the original members of the party caught a 'bus back to Polegate and travelled to town by the 6.30 p.m. train.

The following is the list of the Coleoptera observed by Mr F. D. Buck:—*Notiophilus rufipes*, Curt., *N. biguttatus*, F., *Clivina fossor*, L., *Philonthus laminatus*, Creutz., *Stenus flavipes*, Steph., *Geotrupes typhoeus*, L., *Rhynchites ophthalmicus*, Steph., *R. interpunctatus*, Steph., *R. aeneovirens*, Marsh., *R. (Deporatus) betulae*, L., *Sciaphilus asperatus*, Bond., *Polydrosus tereticollis*, D.G., *Apion aestivum*, Germ., *A. ulicis*, Forst., *A. cerdo*, Gers., *A. curtirostre*, Germ., *Anthonomus pedicularis*, L., *A. inversus*, Bed., *Orchestes quercus*, L., *Coeliodes erythroleucus*, Gmel., and *C. dryados*, Gmel.

22nd APRIL 1939.

FIELD MEETING—BOOKHAM COMMON.

Leader: Mr C. N. HAWKINS, F.R.E.S.

Nearly a week of warm and sunny weather, exceptional for the time of year, had given rise to hopes of a particularly good meeting. Unfortunately, however, a complete change in the conditions set in on Friday evening and the Saturday fixed for this meeting proved to be cold and windy, with a heavy downpour of rain and sleet in the afternoon which soaked everything. In spite, therefore, of not fixing a definite date for our Sallowing Meetings in the programme cards but leaving them to be arranged at the latest possible moment, we were once again defeated by adverse weather. The hot spell during the previous week had caused most of the Sallow very rapidly to pass its best and although some of the Blackthorn blossom was in splendid condition, the cold and wet on the Saturday combined to render it all quite useless as an attraction for insects on that evening at least.

Fifteen members in all attended the meeting, but I am afraid their best "take" was a very enjoyable and welcome tea obtained, as usual in recent years, at the "Mark Oak Gate Tea Rooms," after which most of them made their several ways homeward. The few who remained for evening work had, as already indicated, little reward for their efforts. Very few spring larvae were obtained either by beating during the afternoon or by searching with lamps after dusk and among these few nothing of special interest turned up. Several imagines of the Lepidopteron, *Xylocampa arcola*, Esp., were taken at rest on tree trunks during the afternoon, and *Selenia bilunaria*, Esp., and *Chimabache* (*Diurna*) *pagella*, F., were noted. *Pammene* (*Coccyx*) *argyran*, Hb., was reported by Messrs Attwood and Wakely.

Amongst birds, the following were noted:—Cuckoo (heard), Green and Greater Spotted Woodpeckers (heard), Chiffchaff, Willow Warbler, Kestrel (seen), Swallow (seen), Martin (seen).

In the ponds, Leeches appeared to be scarce this year, two small ones only being observed.

The Coleopterists, whose activities in the mud of the ponds were, incidentally, of great interest to various non-entomological spectators, and whose hearts, if not their noses, were rejoiced by the discovery of a not-too-recently defunct rabbit, fared rather better, and the following list gives the results, so far reported, of their combined efforts in the way of additional (recent) records for the district:—*Elaphrus riparius*, L., *Agonum marginatum*, L., *A. gracile*, Gy., *A. obscurum*, Herbst., *A. fuliginosum*, Pz., *Pterostichus nigrita*, F., *P. strenuus*, Pz., *P. diligens*, Sturm., *Stenolophus teutonius*, Schr., *Acupalpus meridianus*, L., *Anthraxus consputus*, Duft., *Bembidion articulatum*, Pz., *B. biguttatum*, F., *B. clarki*, Daws., *B. dentellum*, Thbg., *B. varium*, Ol., *Hygrobia herrmanni*, F. (*tardus*, Herbst.), *Haliphus ruficollis*, De G., *Laccophilus minutus*, L., *Philydrus testaceus*, F., *Ochthebius impressus*, Marsh., *Aleochara curtula*, Göze, *Philonthus quisquiliarius*, Gy., and var. *inquinatus*, S., *P. micans*, Gr., *Lathrobium elongatum*, L., and var. *fraudulentum*, Gg., *Stenus exiguus*, Er., *Lesteva longelytrata*, Göze, *Necrophorus vespillo*, L., *Thanatophilus sinuatus*, F., *Epuraea unicolor*, Ol., *Nitidula bipunctata*, L., *N. rufipes*, L., *Omosita depressa*, L., *O. discoidea*, F., *Calvia 14-guttata*, L., *Dermestes murinus*, L., *Heterocerus fenestratus*, To., *Necrobia violacea*, L., *Bruchus* (*Laria*) *rufipes*, Herbst., and *Phaedon armoraciae*, L.

Mr Wakely reported taking the sawfly, *Abia loniceræ*, L.

Previous meetings:—1902, 1904, 1910, 1927, 1934, 1935, 1937, 1938.

30th APRIL 1939.

FIELD MEETING—CHARING AND HOTHFIELD, KENT.

As stated in the notice sent to members, this district has not been visited previously by the Society. Unfortunately, the weather on this

occasion was hardly suitable for a Field Meeting, the drizzling rain hardly ceasing a moment from early morn to evening.

From Charing station a short walk uphill led to the ancient trackway known as the Pilgrim's Way. It passes the edge of extensive beech woods and grassy chalk slopes to the village of Westfield. From there one can go by winding lanes to Hothfield Station, or cross Eastwell Park and thence to either Wye or Ashford.

In the circumstances, with only one member attending, the list of captures and observations is extremely small with no items of note.

13th MAY 1939.

FIELD MEETING—EAST HORSLEY.

Leader: Mr WALLIS NORTON.

Owing to the unavoidable absence of Dr C. G. M. de Worms, Mr Wallis Norton kindly offered to lead the meeting. It was held in very good weather conditions. Ten members and one guest took part. The ground covered was that of the Sheepleas extending along the ridge of the North Downs. Owing to the high wind, collecting of some of the Lepidoptera, particularly of *Drepana cultraria*, Fb., was made especially difficult. In spite of this many interesting species were observed, but the general impression was that the season was later than normal. Among the butterflies seen were *Vanessa io*, L., *Callophrys rubi*, L., *Euchloë cardamines*, L., *Pararge aegeria*, L., *Hesperia malvae*, L., *H. tages*, L., but only one *Hamearis (Nemeobius) lucina*, L. Of the day-flying moths those recorded included, besides *D. cultraria*, *Euclidia mi*, Clrck., *E. glyphica*, L., *Calostigia pectinitaria*, Knoch, *Prothymnia viridaria*, Fb., *Bapta temerata*, Schiff., *B. bimaculata*, Fb., *Ematurga atomaria*, L., *Eupithecia sobrinata*, Hb. (*pusillata*, Schiff.), while the leader had the good fortune to find a female *Odontosia carmelita*, Esp., at rest.

The larvae included *Nola cucullatella*, L., *Chloroclystis rectangulata*, L., *Campaea (Metrocampa) margaritata*, L., and *Colotois pennuria*, L.

A representative number of species of other Orders was also collected or observed, including the following:—

COLEOPTERA:—*Aleochara curtula*, Göze, *Philonthus aeneus*, Ross., *Nitidula bipunctata*, L., *Omosita colon*, L., *O. discoidea*, Fb., *Dermestes murinus*, L., *Lochmaea crataegi*, Forst., *Rhynchites aequatus*, L., and *Polydrosus pterygomalis*, Sch.

The Nightingale was heard for the first time this year.

Tea at the "Duke of Wellington" Inn brought to an end a very pleasant day.

21st MAY 1939.

FIELD MEETING—LIPHOOK, HANTS.

Leader: Mr F. D. COOTE, F.R.E.S.

This was the first occasion the Society had arranged a Field Meeting in this district, and 13 members and 3 visitors attended.

Liphook is very near where the three counties of Surrey, Sussex, and Hampshire meet, and is close to large stretches of woods and commons. In the past, owing to its distance from London, it has not been worked very much, but now the railway has been electrified, and with trains every half hour, it is more accessible.

Our party had a comfortable journey from Waterloo in reserved compartments in the Ramblers' Association train, and at Haslemere we were joined by Mr F. A. Oldaker, who has an extensive knowledge of the Lepidoptera of Dorking and Haslemere. Leaving the station, eastwards a short walk brought us to Stanley Common. This has a sandy soil covered with luxuriant heather and groups of birch and pine. Further on, where tracks lead to Linchmere Common, there is a large oak wood. On the occasion of our visit the weather was cloudy and mild, with occasional sunshine. Very few insects were on the wing and members gave most attention to larva beating, the oaks being very productive. It was remarkable that although a fortnight earlier *Saturnia pavonia*, L., and *Pachynemius hippocastanaria*, Hb., had been fairly common in the heather, they were not seen this time.

An excellent tea was served at the Royal Anchor Inn at Liphook. As the return train was not due to leave till 8.29 p.m., it was decided to explore in another direction. A footpath from the outskirts of the village led to Holly Hills and Woolmer. On the edge of this path is a badger's den and here for a time we lost sight of our Coleopterists. After passing the edges of a few fields the path goes through a small boggy wood of willow, alder, oak, etc., and then reaches a heathery slope with pine, birch, and large oak trees. There was not time to attempt any extensive collecting in this area, but it was evident that it should prove very productive.

A long and interesting list of Coleoptera, furnished by Mr F. D. Buck, is appended, and a few by Mr Attwood.

COLEOPTERA:—*Elaphrus cupreus*, Df., *Leistus spinibarbis*, F., *Dromius quadrimaculatus*, Pz., and *D. meridionalis*, Dej., *Anacaena globulus*, Pk., *Xantholinus longiventris*, H., *Catops tristis*, Pz., *Nargus velox*, Spn., *Cateretes pedicularis*, L., *Meligethes atratus*, Ol., *Mysia oblongoguttata*, L. (an impunctate var.), *Enicmus histrio*, Jy., *Corticarina gibbosa*, Hb., *C. fuscula*, Gy., *Micrambe vini*, Pz., *Atomaria affinis*, Sg., *A. ruficornis*, Mm., *Dolopius marginatus*, L., *Rhagonycha lignosa*, Ml., *Grynobius excavatum*, Kl., *Dryophilus pusillus* Gy., *Helodes marginata*, F., and *H. minuta*, L., *Molophilus minor*, L., *Clytus arietis*, L., *Pogonocherus hispidulus*, L., and *P. hispidus*, L., *Phyllodecta viminalis*, L., *Anaspis frontalis*, L., *Rhinomacer attelaboides*, F., *Attelabus nitens*,

Sp., *Rhynchites cupreus*, L., *R. cavifrons*, Gy., *Apion flavipes*, Payk., *Hylobius abietis*, L., *Liosoma deflexum*, Panz., *Orchestes pilosus*, F., *O. avellanae*, Do., *Anthonomus pedicularis*, L., *Balaninus villosus*, F., *Balanobius pyrrhoceras*, Mm.

Of LEPIDOPTERA but few were reported. Imagines:—*Anarta* (*Melanchnra*) *myrtilli*, L., *Leucophthalmia* (*Cosymbia*) *punctaria*, L., *Eupithecia nanata*, Hb., *Bupalus piniaria*, L., *Ematurga atomaria*, L., *Lithina* (*Pseudopanthera*) *chlorosata*, Scop. (*petraria*, Hb.). Larvae:—*Lithosia deplana*, Esp. (*depressa*, Esp.), *Cleoceris* (*Polia*) *riminalis*, Fb., *Hemitha aestivaria*, Hb., *Nemoria strigata*, Müll., *Apocheima* (*Phigalia*) *pedaria*, Fb., *Ellopiia* (*Metrocampa*) *fasciaria*, L. (*prosapiaria*, L.), *Campea* (*Metrocampa*) *margaritata*, L., *Colotois pennaria*, L.

ARACHNIDA:—Specimens of the Tubular Nests of the Spider *Atypus sulzeri*, Latreille, and their inhabitants.

4th JUNE 1939.

FIELD MEETING—ISLE OF WIGHT

Leader: Mr S. WAKELY.

The weather was perfect for the usual spring trip to the Isle of Wight. Once again thanks are due to Mr F. D. Coote for making the necessary arrangements with the Southern Railway for the journey, and for taking charge of the party from Waterloo. The leader joined the other members and friends on Bembridge Down. *Melitaea cinxia*, L., was flying freely, and although a number of rubbed specimens were seen, there were plenty of fresh ones to be found, and those who wanted this species were able to take as many as they pleased. Three specimens of *Parasemia plantaginis*, L., were netted, which is a matter of special interest to Island entomologists, as it is not many years ago when the first captures of this insect in the Island were recorded from Combley Down. A few *Cupido minimus*, Fuessl., and *Polyommatus bellargus*, Rott., were captured, and *Aspitates* (*Crocata*) *ochreuria*, Ross., was fairly common.

Later in the afternoon the party descended the Down to the marshes. Some larvae found here in roots of *Achillea millefolium*, L. (Yarrow), proved to be those of *Hemimene quaestionana*, Zell. The coleopterists tried working with a water net in the ditches, and many species were taken in this way. Proceeding over the railway line, the party walked to the old picturesque village of Brading, where they partook of tea in one of the gardens, and the events of the day were discussed. About a dozen were present.

Coleoptera taken by Mr F. D. Buck included the following:—*Onthophagus ovatus*, L., *Malachius viridis*, F., *Oedemera nobilis*, Sp., *Cryptocephalus aureolus*, Suf., *Sphaeridium bipustulatum*, F., *Prasocuris phellandrii*, L., *Magdalis armigera*, Frery., *Cercyon lugubris*, Ol., *Helophorus aeneipennis*, Th., *Tachinus rufipes*, D.G., *Stenus similis*,

Hbst., *Batophila acrata*, Marsh., *Aphodius ater*, D.G., *Corticaria impressa*, Ol., *Apion malvae*, F., *A. miniatum*, Germ., *Cantharis rusticus*, Fall., *Dascillus cervinus*, L., *Sitona lineatus*, L., *Ceuthorrhynchus troglodytes*, F., *Tychius flavicollis*, Steph., *T. tibialis*, Boh., *Oxytelus laqueatus*, Marsh., *O. sculpturatus*, Germ., *Chaetocnema hortensis*, Fourc., *Isomira murina*, L., and *Enicmus transversus*, Ol.

10th JUNE 1939.

FIELD MEETING—DARENTH WOOD.

Leader: Mr R. W. ATTWOOD.

This famous old collecting ground has not been visited by the Society for many years and it was thought it might be of interest for members to see the terrain whence so many rare insects have been recorded in the past.

The leader had only a slight acquaintance with the area and had paid a preliminary visit to arrange about tea and to make enquiries as to its possibilities. A local man, seeing the beating tray, asked him if he were a "Fly Catcher," and went on to say that in the past "Fly Catchers" came there every week and stayed in the woods at night, but few came nowadays. On asking what kind of "Fly Catchers" they were, the unexpected reply was that "They were quite a nice lot of gentlemen, kept themselves to themselves and never did no harm to nobody." After such a tribute it was deemed safe to broach the subject of bringing a party of "Fly Catchers" to Darenth Wood. The man suggested that permission should be obtained from Mr Merrick, who resides in the Wood, as although Darenth Wood is open to the public, the neighbouring Woods are private. Mr Merrick upon being approached was exceedingly kind and readily gave permission for the party to go anywhere, except in Colliers Wood on the opposite side of the road, an area over which he had no control.

Four members met at the "Fox and Hounds" at the foot of the lane leading to Darenth Wood. The lane after an unprepossessing start develops into a deep cutting, the sides being covered with a very mixed vegetation. *Euchloë cardamines*, L., *Pamphila sylvanus*, Esp., and the "Whites" were noted here while the elm hedge on the right yielded plenty of the beetle, *Magdalis armigera*, Fourc., stated by Joy to be of very local occurrence. Near the top of the lane numbers of nearly full fed larvae of *Vanessa urticae*, L., were feeding on the nettles. Here Darenth Wood commenced and we skirted the edge of the wood adjoining a field of vetch, where more *Euchloë cardamines* were noted and *Polyommatus icarus*, Rott., was abundant. A little beyond this is a large clearing chiefly occupied by small aspens. An imago of *Arctia villica*, L., was taken here, also the larvae of *Clostera curtula*, L., and *Cerura vinula*, L., and the Longicorn beetle, *Saperda populnea*, L.

The burdock plants were heavily attacked by the larvae of *Alucita galactodactyla*, Hb. The caterpillar rests along the ribs on the under-side of the burdock leaf, with which it harmonises so closely in colour that it is difficult to see until one's eyes get accustomed to it.

One or two specimens of *Brenthis (Argynnis) euphrosyne*, L., were seen but were very few in comparison with the previous week and were very worn.

Among the other Orders noted were several males of the dragonfly, *Libellula depressa*, L.; the scorpion fly, *Panorpa communis*, L.; the red and black froghopper, *Triecphora sanguinolenta*, L., and a nearly full grown specimen of the grasshopper, *Omocestus viridulus*, L., an exceptionally early date even for this species.

While no outstanding captures were made, the members were greatly impressed with the very varied nature of the vegetation, which promises well when the area is better known. The Woods are very extensive and consist of the usual forest trees and bushes, oaks, birch, chestnut, hornbeam, aspens, sallow, broom, with occasional beech and yew, but there are numerous clearings with large patches of golden rod, cow-wheat, devil's-bit scabious, galium, myosotis, primrose, bugle, foxglove, campion, ragwort and other useful plants of interest to entomologists. With such a varied flora it is quite easy to understand how so many good insects have been recorded from this district in the past, and it is pleasing to find an area so near to London and yet so secluded.

Tea was taken at the Ship Hotel, Green Street Green, where two more members and two visitors arrived.

The following is a list of the other insects taken or noted:—

LEPIDOPTERA:—Imagines—*Tyria jacobaeae*, L., *Anaitis plagiata*, L., *Xanthorhoe montanata*, Schiff., *Pseudopanthera macularia*, L., *Lithina chlorosata*, Scop. (*petraria*, Hb.), *Cabera (Deilinia) pusaria*, L., *C. exanthemata*, Scop., *Polyommatus medon*, Esp. (*astrarche*, Brgstr.), *Coenonympha pamphilus*, L., *Maniola (Epinephele) jurtina*, L., and *Nemotois degeerella*, L. Larvae—*Polyplocia flavicornis*, L., *Calymnia affinis*, L., *Chesias lepatella*, Schiff., (*Eucestia spartiata*, Hbst.), *Colotois pennaria*, L., *Crocallis elingvaria*, L.

COLEOPTERA:—*Orchestes alni*, L., *Smicronyx reichi*, Gyll., *Balaninus glandium*, Marsh.

APHID:—*Schizoneura lanuginosa*, Htg. Causing a very large gall on elm.

18th JUNE 1939.

FIELD MEETING—WENDOVER, BUCKS.

Leader: Mr R. F. HAYNES.

As this meeting had been primarily arranged for North London members, it was a pity that the only three members who turned up at Marylebone Station in the morning were from S.E. London. Doubtless the depressing weather conditions—cloudy sky and low temperature—

had an adverse effect on the attendance figures. However, the trio, on arrival at Wendover Station, were met by two other members arriving by car.

After a short shower, the weather improved for the time being, and during the morning the party spent their time working the slopes of Coombe Hill. Particular attention was paid to the juniper bushes growing in profusion on the hill-slope, and those who beat these were rewarded with larvae of *Thera* (*Hydriomena*) *juniperata*, L.

Lunch was partaken on a seat on the summit of Coombe Hill, by the new Boer War Memorial. This fine structure has now replaced the old one demolished by a severe storm in January 1938. By this time, a thin drizzle had started to fall, which later developed into a heavy downpour. Although the rain stopped occasionally, and gave way to bright intervals, the dripping foliage made further collecting impossible, and it was therefore decided to abandon the meeting. Nothing of interest was taken during the afternoon except two imagines of *Parasemia plantaginis*, L.

The party proceeded back to the Railway Inn, Wendover, where an excellent tea awaited them. Afterwards, by the kindness of Dr Burton and his daughter, members were driven by car to Harrow and Wealdstone Station, where the party dispersed.

A list of species of all Orders observed or taken during the day is appended.

LEPIDOPTERA:—Imagines—*Euphyia* (*Hydriomena*) *bilineata*, L., *Xanthorhoe montanata*, Schiff., *Coenonympha pamphilus*, L., *Euchloe cardamines*, L., *Parasemia plantaginis*, L. Larvae—*Thera* (*Hydriomena*) *juniperata*, L. Pupae—*Hylophila bicolorana*, Fuess., *Zygaena trifolii*, Esp., *Z. filipendulae*, L.

PLANTS:—Bird's Nest Orchis (*Neottia nidus-avis*, Rich.), White Helleborine (*Epipactis latifolia*, All.).

GALLS:—On Ground Ivy (*Nepeta hederacea*, Trc.), *Lipsothenus glechomae*, För.

24th JUNE 1939.

FIELD MEETING—BOXHILL.

Leader: Mr F. J. COULSON.

In spite of the extremely bad weather conditions, ten members and friends were present. Heavy downpours of rain occurred in the afternoon, but an improvement in the conditions during the evening resulted in a fair bag being obtained, although the saturated vegetation made collecting rather unpleasant.

In the forenoon the woods above the river were traversed by a few members, and a number of the Gold-crested Wren, as well as, at the stepping stones, a Kingfisher, were observed. The afternoon was spent in the Juniper Valley, and later the woods and the slopes were explored.

The Bird's-nest Orchis (*Neottia nidus-avis*, Rich.) and the Pyramidal Orchis (*Orchis pyramidalis*, L.) were seen in flower and the Roman Snail (*Helix pomatia*, L.) was noted, on the slopes.

As regards lepidopterous larvae, *Cucullia verbasci*, L., in all sizes were found on the mullein. *Lithosia deplana*, Esp. (*depressa*, Esp.) and *Gonoptera* (*Scoliopteryx*) *libatrix*, L., larvae were also taken. The imagines seen or taken were all well known and common to the area.

The Coleoptera taken or observed were representative of the commonest species of this well-worked locality.

8th JULY 1939.

FIELD MEETING—CLANDON.

Leader: Mr F. STANLEY-SMITH, F.R.E.S.

Five members and one visitor attended. The weather was not at its best, for a high wind was blowing which made beating almost impossible. From Newlands Corner we worked South-west across Aldbury Downs towards Chilworth. Two specimens of *Pogonochaerus hispidus*, L. (Col.) were taken from a dead holly bush and *Cryptocephalus hypochroidis*, Su. (Col.) was found in plenty on the more open parts of the Downs.

Lepidoptera were rather scarce and the more interesting ones taken were *Ptychopoda trigeminata*, Haw., *Euchoera luteata*, Schiff., *Vanessa c-album*, L., and *Epinephele hyperantus*, L. The only larvae recorded were *Taeniocampa* (*Monima*) *gothica*, L., *Harmodia capsicola*, Hübn., *Lymantria monacha*, L., and *Eupithecia venosata*, Fabr.

During the afternoon one specimen of the beetle *Abdera biflexuosa*, Ct., was taken from a small chalk pit. Later the coleopterists found a large patch of fungus from which numerous beetles, representing several species, were taken, including *Autalia impressa*, Ol., *Nossidium pilosellum*, Marsh., *Ptomaphagus subvillosus*, Göze, and one or two species of *Gyrophæna* and *Atheta*. At the roots of the fungus, *Bolitobius lunulatus*, L. was found in considerable numbers.

The species taken and not mentioned above were:—

LEPIDOPTERA:—*Ptychopoda aversata*, L., *Epinephele jurtina*, L., and *Pamphila sylvanus*, Esp.

COLEOPTERA included the following:—*Leistus ferrugineus*, L., *Microlestes maurus*, Sturm., *G. fasciata*, Mm., *Mycetoporus splendens*, Marsh., *Quedius picipes*, Mm., *Anthobium ophthalmicum*, Pk., *Anistoma humeralis*, F., *Aphidecta oblitterata*, L., *Hister striola*, Sg., *Epurea deleta*, St., *Triphyllus bicolor*, F., *Athous longicollis*, Ol., *Malthinus flaveolus*, Pk., *M. fasciatus*, Ol., *M. balteatus*, Scop., *Malthodes marginatus*, Lt., *M. minimus*, L., *Malachius viridis*, F., *M. marginellus* Ol., *Tetrops praeusta*, L., *Cryptocephalus moraei*, L., *C. fulvus*, Gz., *Longitarsus anchusae*, Pk., *Chrysomela hyperici*, Forst., *Batophila rubi*, Pk., *Psylliodes affinis*, Pk., *Lagria hirta*, L., *Anaspis pulchra*, Cos., *A. rufilabris*, Gy., *Notoxus*

monocerus, L., *Apion viciae*, Pk., *A. cracca*, L., *A. assimile*, K., *A. flavimanum*, Gy., *Otiorrhynchus desertus*, v. *muscorum*, Bris., *Barynotus obscurus*, F., *Phytonomus arator*, L., *P. ononidis*, Ch., *Sitona crinitus*, Hb., *Dorytomus taeniatus*, F., *Tychius tibialis*, Bh., *T. picirostris*, F., *Anthonomus pedicularis*, L., *Acalles ptinoides*, Gy., *Coeliodes erythroleucus*, Gl., *Balaninus glandium*, Mn., *Magdalis barbicornis*, Lt.

HEMIPTERA:—*Phylus coryli*, L., v. *avellanae*, Mey., *Psallus variabilis*, Fall., *Pentatoma rufipes*, L., and *Euacanthus acuminatus*, Fab.

ORTHOPTERA:—*Ectobius panzeri*, Steph., v. *nigripes*, Steph.

List of Plant Galls reported from Albury Downs, 8.vii.39 by M. Niblett:—

CYNIPIDAE:—*Diplolepis divisa*, Htg., *Neuroterus lenticularis*, Oliv., and *Rhodites rosae*, L.

CECIDOMYIDAE:—*Perrisia ulmariae*, Bremi, *P. urticae*, Perris, and *P. acrophila*, Winn.

PSYLLIDAE:—*Trichopsylla walkeri*, För.

ERIOPHYIDAE:—*Eriophyes macrorrhynchus*, Nal., *E. origani*, Nal., *E. similis*, Nal., and *E. goniothorax*, Nal.

Also larvae of the Trypetid fly, *Philophylla heraclei*, L.

16th JULY 1939.

FIELD MEETING—NEW FOREST.

Leader: Mr F. STANLEY-SMITH, F.R.E.S.

We have visited the New Forest several times recently at different times of the year; on this occasion the Ramblers' train enabled us to go in the heyday of the butterfly season. Unfortunately, the weather was somewhat unpropitious. No rain actually fell while we were in the Forest and fitful sunshine brought a few insects on the wing at intervals. A party of 22 travelled down by the train. The coleopterists detrained at Beaulieu Road and worked the Matley Bridge region. From Brockenhurst Station the remainder, augmented by 7 more members, worked back along the railway bank into Stubby Copse and Wood Fidle.

A few *Argynnis paphia*, L., v. *valesina*, Esp., were seen and taken; larvae and pupae of *Nonagrius typhae*, Esp., were found as usual in the brickfield pond; the Micro workers report larvae of *Leucoptera lathyri-foliella*, Staint., and *L. lotella*, Staint., in blotches in leaves of *Lathyrus sylvestris*, L., and *Lotus major*, Scop., respectively.

Tea was taken during showers at the Rose and Crown. Time was left afterwards for some exploratory work on the outskirts of the village. Eighteen years before numbers of *Mania maura*, L., had been found under a concrete bridge on the edge of the open heath; it was most interesting to find that the same spot to-day produced half-a-dozen of the same species.

The Lepidoptera reported were species generally found in the Forest at this time of the year and often reported.

ORTHOPTERA:—*Leptophyes punctatissima*, Bosc., *Meconema thalassinum*, D.G., *Metrioptera brachyptera*, L., all immature.

HOMOPTERA:—*Triecphora sanguinolenta*, L.

ODONATA:—*Orthetrum coerulescens*, Fb.

Plant Galls reported at Brockenhurst, 16.vii.39, by M. Niblett:—

CYNIPIDAE:—*Diplolepis quercus-folii*, L., *D. longiventris*, Htg., *D. divisa*, Htg., *A. ostreus*, Gir., *A. fecundatrix*, Htg., *Cynips kollari*, Htg., *Rhodites rosae*, L., *Aulacidea hypochoeridis*, Kief., *Neuroterus fumipennis*, Htg., *N. lenticularis*, Oliv., and *N. numismatis*, Oliv.

TRYPETIDAE:—*Noëta pupillata*, Fal.

CECIDOMYIDAE:—*Lasioptera rubi*, Heeg., *Perrisia ulmariae*, Bremi, *Rhopalomyia ptarmicae*, Vallot, and *Macrodiplosis dryobia*, F. Loew.

PSYLLIDAE:—*Trichopsylla walkeri*, För., and *Psyllopsis fraxini*, L.

ERIOPHYIDAE:—*Eriophyes macrochelus*, Nal., *E. macrorrhynchus*, Nal., *E. gibbosus*, Nal., *E. nalepi*, Fock., and *E. laevis*, Nal.

23rd JULY 1939.

FIELD MEETING—BENFLEET, ESSEX.

Leader: Mr R. W. ATTWOOD.

The recent heavy rainfall and threatening aspect of the weather doubtless acted as a deterrent, as only five members and one visitor attended. Fortunately, however, there was no rain during the day, and the Field Meeting passed off successfully.

The morning was spent working the salt marshes and the afternoon the rough hillside. In spite of the dull weather insects were numerous. The local Essex Skipper, *Adopoea (Pamphila) lineola*, Ochs., was common along the seawall, while on the hillside *Satyrus (Melanargia) galathea*, L., *Maniola (Epinephele) tithonus*, L., and *M. (E.) hyperantus*, L., were plentiful. The second brood of *Polyommatus icarus* was just emerging, as also was the summer broods of the "Whites," *Zygaena filipendulae*, L., and *Ortholitha chenopodiata*, L. (*limitata*, Scop.), were abundant, the latter so much so in one part that it recalled its old name of the "Aurelians Plague." A very striking variety of *S. (M.) galathea* was taken on the hillside. The underside of the hindwings are brown inclining to orange, with the markings rather pale grey. The forewings are white and black with a yellowish-brown streak along the costa. The upperside of the wings are normal. The insect is unfortunately slightly deformed.

Dragonflies were rather scarce, but *Lestes dryas*, Kirby, was seen in some numbers and an occasional *Sympetrum sanguineum*, Müll.

The local Grasshopper *Metrioptera roeselii*, Hagenb., was very common but none of the macropterous form was noted. Three specimens of *Tettigonia viridissima*, L., were taken, and an Earwig with excep-

tionally large and deeply notched forceps was taken on the Salt Marsh, *Forficula auricularia*, L., var. *forcipata*, Steph.

The Coleopterists reported a very successful day's collecting. A large number of species were taken, some of rather local occurrence and of more than usual interest.

A strenuous day was followed by a very welcome tea at the "Hoy" Inn.

Mr F. D. Buck has recorded the following species of Coleoptera not previously recorded:—*Ophonus brevicollis*, Dj., *Dichirotrichus pubescens*, Pk., *Pogonus chaldeus*, Mn., *Bembidion guttula*, F., *B. minimum*, F., *B. lunulatum*, Fc., *Ochthebius impressicollis*, Cs., *Brachygluta waterhousei*, Ry., *Subcoccinella 24-punctata*, L., *Leptura (Strangalia) livida*, F., *Laria loti*, Pk., *Tanymecus palliatus*, F., and *Ceuthorrhynchus pyrrhorhynchus*, Mm.

13th AUGUST 1939.

FIELD MEETING—ROYSTON.

Leader: Mr G. R. SUTTON.

The Royston Field Meeting was not very well patronised, the Leader journeying from King's Cross on the appointed train in solitary state. At Royston, however, two other members, who had travelled by car, met the train, and the small party walked to the Heath, famous for its *Lysandra*, *Polyommatus coridon*, Poda. We found the species in smaller numbers than usual, and although no extreme forms of var. *semisyngrapha*, Tutt, were obtained, some individuals showed a tendency in that direction. After tea the party returned to town by car. The other species noted during the day were:—

LEPIDOPTERA:—*Pararge megera*, L., *Maniola tithonus*, L., *M. jurtina*, L., *Coenonympha pamphilus*, L., *Aglais urticae*, L., *Polyommatus icarus*, Rott., *Pieris brassicae*, L., *P. rapae*, L., *P. napi*, L., *Adopoea sylvestris*, Poda, *Xylophasia monoglypha*, Hufn., *Charaëas graminis*, L., *Ortholitha chenopodiata*, L. (*limitata*, Scop.), *Euphyia (Camptogramma) bilineata*, L., and *Zygaena filipendulae*, L.

19th AUGUST 1939.

FIELD MEETING—EYNSFORD.

The meeting was attended by seven members. The weather being exceptionally hot no great distance was covered, the party working only as far as the gun-testing range, where the lepidopterists found numerous butterflies to occupy their attention. Among these were *Vanessa c-album*, L., *V. io*, L., *V. cardui*, L., *Satyrus semele*, L., *Lycæ-nopsis argiolus*, L., and *Polyommatus icarus*, Rott.

Mr Wakely reported a few larvae of *Stephensia brunnichiella*, L., mining the leaves of *Calamintha clinopodium*, Spen. (wild basil). Moths emerged several weeks later. Mr Attwood reported *Pholidoptera cinerea*, L. (Orthoptera), from the downs.

Coleoptera were quite numerous, and with the more common of the usual species were taken *Epitrix atropae*, Fd., *Ceuthorrhynchus litura*, F., and *C. pyrrhorhynchus*, Mm., and *Lema melanopa*, L. The three Apions—*A. malvae*, F., *A. rufirostre*, F., and *A. radiolus*, K., were taken on *Malva*.

Further captures included the following not previously reported:—

LEPIDOPTERA:—*Gonepteryx rhamni*, L., *Pamphila comma*, L., *Pararge megera*, L., *Pyrausta cingulata*, L., and the larvae of *Pterophorus carphodactylus*, Hübn.

COLEOPTERA:—*Tachyporus formosus*, Mt., *Synharmonia conglobata*, L., *Enicmus transversus*, Ol., *Cis bilamellatus*, Lw., *Phyllotreta conso-brina*, Ct., *Sphaeroderma rubidum*, Grl., *Apion flavipes*, Pk., *A. aestivum*, Gm., *A. flavimanum*, Gy.; and Mr F. T. Grant reported:—*Cryptocephalus fulva*, Göze, *Rhizobius litura*, Fb., *Sitones hispidulus*, Fb., *Cis setiger*, Mell., *Phyllotreta nigripes*, Fb., *P. undulata*, Kuts., *Ceuthorrhynchus assimilis*, Pk.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read 13th January 1940.

By HAROLD B. WILLIAMS, LL.D., F.R.E.S.

THE Report of the Council, which you have received, will satisfy you that the Society remains in a strong position, and I think you will agree that a membership of 261 in these troubled times must be regarded as satisfactory. During the year eleven new members have been elected; six have resigned, and four have died. My predecessor, a year ago, spoke of the work of Commander J. J. Walker, R.N., and Palmer Brodie. We have also to mourn the loss of A. E. Tonge, of Reigate, and of Dr J. Hope.

A. E. Tonge was elected in 1902 and occupied the chair in 1912-13. He served the Society for very many years as Treasurer, and his careful management of our finances left us under a lasting obligation to him. He was interested in the Lepidoptera, and many notes from his pen, particularly on the fauna of Surrey, are to be found in our magazines. He will be remembered for his painstaking and beautiful work on the photo-micrography of the eggs of Lepidoptera, examples of which have been published in our *Transactions* and elsewhere and which represent a notable contribution to scientific knowledge. He had, I believe, photographed the eggs of very nearly all our British Macrolepidoptera. We have lost not only a serious student of the early stages of Lepidoptera, but also one whose personality made a notable contribution to the pleasant atmosphere of our meetings and whose genial smile and ready word of encouragement to the beginner did more than is commonly recognised to make the South London Society what it is to-day.

Dr John Hope joined us in 1937 and though he was not a regular attendant at our meetings, living, as he did, in Cheshire, he contributed annually to the success of our Exhibition evening, and from what we were privileged to see on those occasions there can be no doubt that, had he been spared, he would have interested and instructed us upon the variation of the Lepidoptera in the rich county in which he had made his home.

I ask you to stand for a few moments as a tribute to the memory of our lost friends.

I cannot pass from the consideration of our membership without commenting on the fact that four members have celebrated their jubilee as members of the Society during my year in the chair—evidently the individual members enjoy the same health and vigour as the Society does.

The activities of the Society have been slightly disturbed by two factors beyond its control. The first of these, resulting in our removal to these rooms, will, I am confident, enable us to look forward to many years of useful work in our traditional centre. The second must for a time limit our activities, but as the Society was able to continue its activities during the war of 1914-1918 and to provide a rallying point for entomologists when all was done, I have no doubt that we shall survive the inconvenience, the irritation and the burdens which are inseparable from a state of war and carry on to a prosperous future. Several of our younger members are already serving with His Majesty's Armed Forces and we wish them all a safe and a speedy return to us.

During the summer we were given hospitality in the rooms of the Royal Entomological Society at Queen's Gate, and the thanks of the Society are due to our elder sister Society for this great honour.

Dr Karl Jordan once remarked to me that the study of nature is in its infancy. It is an observation which we should do well to keep always in mind, for we are apt to suppose that our petty discoveries have given us a real understanding of the structure, life, and relationships of insects, whereas in truth those discoveries are like scattered lamps, which merely serve to render conspicuous the extent of the darkness of ignorance in which we walk. After all, the human race has interested itself in insects from a scientific standpoint for only about 200 years, and in a field where the workers are few the harvest is slowly gathered.

I propose to speak to you this afternoon on a group of Pierine Butterflies which serve well to illustrate those introductory remarks.

PRELIMINARY OBSERVATIONS ON THE GENUS *GONEPTERYX*, LEECH.

The species now included in the genus *Gonepteryx* have been studied since the days of Linnaeus, but we have not yet been able to ascertain how many species there are in the world, or even to ascertain with any approximate approach to accuracy how many species are known to us. Leech, in his "Butterflies from China, Japan, and Corea," treats the genus as consisting of two species, *aspasia* and *rhawni*. He refers to *aspasia* the forms, be they species or subspecies, *acuminata*, *alvinda*, and *zaneka*, and to *rhawni* all the other forms of the genus known to him, including such diverse forms as *cleopatra*, *farinosa*, and *amintha*. Röber, in "Seitz' Macrolepidoptera of the World," I, 62, admits that it is very difficult to separate the species of the *aspasia* group, a proposition which he says is abundantly proved by Leech's entirely abor-

tive attempt, and he does not maintain that his own exposition is correct.

I am convinced that in time further discoveries will throw a light on these problems which will enable us to understand them. It has, however, seemed to me that it might not be unprofitable to-day to ask you to attempt to ascend with me some imaginary height of science and survey from thence some of the problems which await solution. When that picture is in our minds I shall offer a few comments on some of the work that has been, and is being, done in the genus.

The genus *Gonepteryx* probably consists of eight or nine species, the majority of which resemble each other very closely, distributed over the whole of the Palaearctic Region, and of three larger species confined to tropical America, which are commonly referred to the genus *Anteos*, Hb., but which are very slightly distinguished from *Gonepteryx*. I do not propose to discuss these American species to-day. They form a separate homogeneous group and are not associated with any of the difficulties of which I wish to speak.

In addition to their Palaearctic distribution, at least two, and possibly three, species are found in India and Burma, and there are two old records of the occurrence of *G. rhamni* in California.* Of these one cannot imagine that Boisduval can have mistaken any other species for *rhamni*. Possibly one of his correspondents had mixed up his insects. The species is not now regarded as having any claim to an American domicile, but I do not think the possibility of its occurrence in North America should be dismissed too positively, as, having regard to its very wide established distribution, there seems no reason why it should not occur there, and the Butterflies of the Pacific Coast have not been very thoroughly studied.†

I have referred to the number of species in the genus in vague terms because it is impossible, in the present state of knowledge, to say precisely to how many species the known forms ought to be referred. The forms known fall into three principal groups, which may be distinguished by the colour of the males. In the first group the male is entirely yellow; in the second the male has whitish hindwings, and in the third the male has the forewings more or less suffused with orange. This, as will appear, is a rough and ready classification, but it may be interesting to see how we can fit the known forms into it.

The first group includes *rhamni* and *farinosa*. These are abundantly distinct species, *rhamni* being distributed over practically the whole of the Palaearctic region, while *farinosa* occurs in Asia Minor and as far East as Turkestan, and is also known from Greece. The females of the two species closely resemble one another on the upperside. For long *farinosa* was regarded as a variety of *rhamni*, and even Tutt, who

*Boisduval, "Ann. Soc. Ent. Fr.," 1852, p. 275 and p. 286. Weidemeyer, "Proc. Ent. Soc. Phil.," II, 152 (1863-64).

†The work of H. Edwards, Comstock and Wright is admirable, but little has been done by others.

cannot possibly be considered a "lumper," so treats it, referring to it as "a southern form."‡ In fact, the mealy appearance, which is its distinguishing characteristic, is due to the fact that the scales are distinct from those of any other species of the genus, being long and thin, and a little curled upwards. These scales are well figured by Verity in "Rhopalocera Palearctica," and are not, I think, the sort of defective scale with which our new President has made us familiar.

There are other forms in which the males are entirely yellow, e.g., *acuminata*, but I will refer to these later.

In the second group we must certainly place *aspasia*, which in its typical form has white hindwings in the male. The forewings are yellow, but this becomes paler towards the outer margin. The species was described by Ménétériés in 1859 in "Schrenck's Reisen und Forschungen im Amur-Lande," II, 17, and was figured in that book, pl. 1, fig. 6. The figure is a poor one, but fortunately a co-type from Ménétériés' collection passed into the collection of Guenée and thence into the Oberthur collection and is presumably now in the British Museum. This insect was figured by Verity, "Rhop. Pal.," pl. 48, fig. 1. The species was described from Amur and it occurs there, in Corea, Turkestan, and S.E. China and Japan, apparently at times in very considerable numbers, for Graes records taking 70 larvae from one small plant of *Rhamnus davurica* at Chab in the spring of 1882.*

Two other forms, with whitish hindwings in the male, may or may not be subspecies of *aspasia*. These are *G. zaneka*, Moore, from the N.W. Himalayas and neighbouring parts of India, and *G. alvinda*, Blanchard, from Thibet.

G. zaneka is a small form with deeply dentate hindwings. It was described in the "Proceedings of the Zoological Society" for 1865, p. 493, and figured in that Volume, pl. xxxi, fig. 18. This figure is so bad that the sex cannot be determined, but it gives an idea of the size and shape. The evidence, if any, on which this has been treated as a subspecies of *aspasia* has not been made available to students. It occurs at a great distance from any known form of *aspasia* unless *alvinda* is a form of that species, and if *alvinda*, isolated, so far as we know, in Thibet, is a form of *aspasia*, then *zaneka* is remarkably different in form from the nearest form of a widespread species. It is in any event one of a number of small and obscure forms peculiar to the Indian Region and should, I think, be regarded as distinct, until clear evidence of its specific identity is forthcoming.

G. alvinda from Thibet is little known. There is a series in the National collection, from an examination of which it appears that the white hindwing of the male, as figured by Seitz, is by no means constant. Some have the hindwings flushed with yellow and in others the hindwings are nearly as yellow as the forewings. On a general view

‡ "Brit. Butts." (1896) 264.

* "Berl. Ent. Zeit.," xxxii, 70 (1888).

I think the specimens in the Museum bear more resemblance to *G. aspasia* than the figure in Seitz would suggest.

In the third group we may include *cleobule*, *cleopatra*, and *amintha*.

These orange species provide us with an interesting study in distribution. In *cleobule* the forewings of the male are entirely, or almost entirely, orange, and the hindwings somewhat flushed with this colour. The species is confined to the Canary Islands.

At the opposite end of the area of distribution of the genus, in China and Japan, occurs *amintha*, in which the forewings of the male are orange, of a paler shade than in *cleobule*.

G. cleopatra has a wide range, extending from Madeira to Asia Minor. The Madeira form, subsp. *maderensis*, Felder, has the orange suffusion of the forewing almost as extensive as in *cleobule*, while in Asia Minor a form occurs, subsp. *taurica*, Stdgr., with very limited orange suffusion, so limited that examples have been supposed to be hybrids between *cleopatra* and *rhamni*. *G. cleopatra* has once been recorded from Vladivostock (subsp. *orientalis*, Röber) but one imagines there may have been some mistake about this specimen. I may perhaps here observe that the figures of forms of *cleopatra* in "Seitz" are exceedingly bad. They appear to me to be indistinguishable, and certainly the figure alleged to be of *taurica* has no resemblance whatever to that form.

I have mentioned so far eight forms, two of which, *zaneka* and *alvinda*, are not generally regarded as of specific rank. I do not think there are any points in the variation of *rhamni* and *farinosa* to which I need refer and I will therefore endeavour to introduce to your notice some of the difficulties presented by the *aspasia* group.

G. aspasia is very variable and forms usually associated with it approach the colouring of the other groups. For example, *acuminata*, Felder, which has a distribution very similar to that of *aspasia*, has the hindwings of the male yellow, as in *farinosa*, and all the wings much broader than in typical *aspasia*. C. and H. Felder described it ("Wiener Ent. Monatsschrift," vi, 23 (1862)) as a "var." of *aspasia*, and it has been so treated since, though I do not think that treatment has ever been the subject of critical consideration. I am far from saying it is wrong; I do not know. But I think it a little strange that an insect so distinct should have been treated by its describers as a subspecies of *aspasia* and I wonder sometimes whether that treatment has not been blindly copied since.

A form of *acuminata* occurring in Japan, ab. *niphonica*, Verity ("Rhop. Pal.," 1909, 280), has the forewings lightly flushed with orange, sometimes as bright as in *amintha*. It is figured in "Rhop. Pal.," pl. 48, fig. 5. *G. rhamni*, subsp. *maxima*, is also flushed with orange, not unlike that of *amintha*.

Let me here observe that the figure of *aspasia* in "Seitz" cannot possibly represent any form of that species now known unless it be *acuminata*, ab. *niphonica*. It is more like *rhamni*, subsp. *maxima*.

I will now ask you to consider a group of four small forms of extremely limited distribution—*zaneka*, *zanekoides*, *taiwana*, and *chitralensis*. Of *zaneka* I have already spoken. *Zanekoides* is a little known form from the South Chin Hills in Burma, of a deeper colour and with broader wings. The females are extremely similar. It was described by de Nicéville in the "Journal of the Asiatic Society of Bengal," lxvi, p. 564.

G. chitralensis is a most remarkable form from Chitral, described by Moore in "Lepidoptera Indica," vii, 27. The only yellow, even in the male, is a basal suffusion on the forewings. I doubt if specimens exist outside the British Museum and it has never been figured in colour. Verity treats it as a form of *G. rhamni*, subsp. *nepalensis*, and Talbot, following Peile and W. H. Evans, as a subsp. of *farinosa*. The first of these determinations appears impossible in the absence of any scientific explanation, and my own early inclination to regard it as a form of *zaneka*, treating that form as of specific rank, is perhaps hardly more satisfactory.* It may well be a distinct species. The treatment of *zaneka*, *zanekoides*, and *chitralensis* as forms of a small species with deeply dentate hindwings peculiar to India and Burma is tempting at a first glance, but it has recently been made clear that a form not very dissimilar to *zanekoides* occurs in Japan. This is *taiwana*, Paravicini ("Suppl. Entom. Berlin," 1913, p. 76). An insect is figured under this name in Yawakawa's "Butterflies of Japan," 2nd edn., pl. 25, fig. 5. It has the hindwing outline characteristic of the group under discussion, and very large discoidal spots on the hindwings.

G. zaneke, *G. zanekeoides*, and *G. taiwana* are generally treated as forms of *aspasia*, an unfortunate species, which is a dumping ground for any difficult form. Perhaps there is no great harm in giving these difficult and obscure forms a temporary home, but there have been more mischievous consequences, and I must therefore turn aside from this review to consider the tiresome subject of nomenclature.

Some two years ago I was staggered to find the series of *aspasia* in the National Collection labelled "*mahaguru*, Gistel," and it is so treated in "Lepidopterorum Catalogus," part 66, pp. 518-9, and in Talbot's recent work on the "Butterflies of India."†

Let us first have the facts.

In an obscure German publication, "*Vacuna oder die Geheimnisse aus der organischen und leblosen Welt*," Vol. 2 (1857), of which the only copy in London is in the Library of the Linnean Society, Gistel, a German pseudo-scientist who has, so far as I can discover, no other claim to fame or notoriety, published a paper with the staggering title,

*No reasons have been given for identifying it with *farinosa*. It may be observed, however, that the female undersides are precisely similar (though the male undersides are not) and that there is a general similarity in outline, too dangerous a coincidence in this genus upon which to found any conclusion.

†Fauna of British India. "Butterflies," Vol. 1, 1939.

“Achthundert und zwanzig neue oder unbeschriebene Insekten.” The title should perhaps be regarded as the equivalent of the roadside notice, “You have been warned,” for the description in 1857 of 820 new forms at once must be pregnant with synonymy. Over 800 of these creatures are beetles, but on p. 608 there is a description which I will quote in full.

“*Rhodovera mahaguru*. R. alis integerrimis angulatis flavis, singulis puncto majori intensius flavo, subtus ferrugineo, alis anticis margine externo profundius exciso; apice alar. post. margine post. brevior et truncato, dentibus duobus minutissimis margine interno. Himalaya.”

If this is the same as *zaneka*, the name *mahaguru* has priority, and if *zaneka* is the same species as *aspasia*, described in 1859, then *mahaguru* is the specific name.

The name *Rhodovera* is of course a mistake for *Rhodocera*, and apart from the use, or misuse, of that generic synonym, there can be little doubt that we are confronted with the description of a species of *Gonepteryx*. If it be a description of *zaneka* we are further confronted, or affronted, with the remarkable facts that there is no reference to its small size, that the wings are said to be yellow and there is no reference to the whiteness of the hindwings, and that emphasis is laid on the presence on the margin of the hindwings of two most minute “teeth,” whereas in *zaneka* there are certainly more than two, and that species, or form, is distinguished from all other species or forms of the genus by the exaggerated and prominent size of the “teeth” on the margin of the hindwings, which could by no misuse of language be described as “most minute.”

For these reasons I am of opinion that the identification of *mahaguru* with *zaneka* is an absolutely impossible one and cannot be supported. I do not know that I feel greatly concerned to find a new home for the name. I should prefer to return it to the decent interment from which it was unfortunately resurrected, but it may be as well to point out that the description applies, without any of the inconsistencies I have mentioned, to *nepalensis*, Doubleday, a subspecies of *rhamni* known to occur in the Himalayas. *Nepalensis* was described in 1847, and *mahaguru* may be sunk as a synonym.

I may add that there is in any event no evidence in support of the specific identity of *aspasia* and *zaneka*.

The species of *Gonepteryx* are single-brooded and hibernate as imagines. They are very long-lived, hibernated examples remaining on the wing in spring until a few weeks before the emergence of the new generation in July and August. This short statement is applicable to the Palaearctic species. I think the life-history of the others is unknown.

During so long an existence in the perfect state, changes naturally take place in the appearance of the insects, as they become worn and polished by the contact with foliage, etc. As their wings are of a remarkably strong structure these changes take place without the accom-

paniment of tearing and fraying of the membranes which characterises the mature age of most other insects. Consequently insects are to be found on the wing in the early autumn and in early spring, which differ in appearance from bred examples of the same species, and in complete lists such as are to be found in Talbot's work in "Lepidopterorum Catalogus," it will be observed that names have been given to the second, and even to the third "broods" of *cleopatra* and *rhamni*, and reference to the writings of the authors of those names will show that the forms named are described in some detail and the distinction in colour meticulously indicated.

The history of this subject is a little Entomological comedy in three acts, which does not appear to have been sufficiently studied, for I find these names in various modern books of reference with no indication of any doubt as to their validity. These names are not valid and it may be well to give their history. I will deal in detail with *G. cleopatra*.

In "Berl. Ent. Zeits.," xxvi, 125 (1882), Gerhard describes a form of *cleopatra* as var. *italica*, with a yellowish underside in the male, and an almost entirely white one in the female. Again, Foulquier, in his "Catalogue Raisonné des Lépidoptères des Bouches du Rhône," Marseilles, 1899, describes a variety *massiliensis* in very similar terms.

These names were treated as synonyms, as they are, e.g. by Staudinger and Rebel, and by Verity. In "Seitz, Macrolep.," I, 61, Röber says that similar forms occur in spring, and doubts whether any *Gonepteryx* species has more than one brood in the Palaearctic Region. Verity, in "Rhop. Pal.," p. 286, treats *italica* as "gen. aest." (with *massiliensis* as a synonym) and says that it occurs in the heart of summer in very warm regions. In "Ent. Rec.," xxxi, 66, he is more communicative, and says:—

"The researches conducted with great activity since the beginning of this century have increased our knowledge of the morphological variations of Lepidoptera in a notable manner, but many biological data have remained very deficient, and amongst these the data concerning the number of annual generations of each species. This, without doubt, is explained by the fact that the great majority of entomologists inhabit Central Europe, where there only occur, for the most part, one or two broods, of short duration and clearly to be distinguished, and because in the South of Europe observations have nearly always been made in an interrupted and incomplete form. Therefore the literature of the subject is full of hasty and hypothetical conclusions. It is enough to cite the case of Röber, the specialist in *Pieridae*, who states in as recent a work as the 'Gross-Schmetterlinge der Erde,' Seitz edition, p. 61, that the *Gonepteryx* have only one brood in all the Palaearctic region!"

At p. 87 of the same volume he names the second generation of *cleopatra*, *secunda* and the third generation *tertia*.

Turner in his article on the "Butterflies of Cyprus" ("Tr. Ent. Soc. Lond., 1920, 170, at p. 183), accepts the occurrence of more than

one brood in Cyprus and quotes G. F. Wilson's view that there are three broods.

In "Ent. Rec.," xxxii, 197, J. A. Simes discusses the evidence for and against the existence of more than one brood of *cleopatra*. He records from his own observations that butterflies freshly emerged in June or July show no inclination to pair, have no other interest in life but to feed, and are to be seen wandering away into the thick scrub, from which they may be disturbed in late summer and autumn. He also points out that *Rhamnus alaternus*, the food plant, is an ever-green which has abundance of fresh leaves in spring, but in summer has leaves which are hard and dry and impracticable as food for a Pierid larva and that there is no evidence of egg laying, or of the occurrence of larvae or pupae before the alleged second brood.

It is interesting to recall that Foulquier (*loc. cit.*) says of *cleopatra*.

"Superbe papillon. A deux éclosions, la première fin Mars et courant Avril, la deuxième fin Juin et première quinzaine de Juillet.

"La deuxième génération provient de chenilles vivant en Mai sur la nerprun. Malgré nos recherches, il nous a été impossible de découvrir les chenilles donnant la génération printanière."

The last word on this subject is again spoken by Verity, with the frankness of the true scientist, whose only concern is the accuracy of knowledge, in "Ent. Rec.," xxxiv, 69, where he says he had never doubted the occurrence of three generations until reading Simes' article, but that he and Querci devoted much time to the genus in 1921 and could find no proof of reproduction more than once a year. He therefore concludes that Röber and Simes must be right and that the different colours are due to fading.

It therefore appears that the names *secunda* and *tertia* describe a scientific entity which does not exist. They are names unclothed with reality, and should be abandoned as invalid.

The same observation applies to *massiliensis*, a name given on the assumption that two generations occur.

As to *italica*, until proof is produced that a form of *cleopatra* exists with a yellow underside in the male when fresh and not as a result of fading, I propose to treat the name as invalid. It is impossible to justify the existence of an aberrational name for a worn or faded example of an insect, in the appearance of which a colour change has taken place since its emergence for no other reason.

The same observation also applies to the names *secunda* and *tertia*, given to second and third generations of *rhamni* by Verity.

It would not be appropriate within the limits of this address to attempt a detailed survey of the genus, but we may perhaps feel that we have reached a sufficient height in our imaginary climb to note some of the outstanding features of the landscape.

It is impossible not to be struck with the remarkable distribution of *G. rhamni*. Omitting the American species, if they be *Gonepteryx*, it appears that *G. rhamni* occurs throughout the Palaearctic and Indian

Regions wherever any species of the genus is found, except in the Canary Islands, and also occurs in a great many places where no other species of the genus is known to exist.

The next remarkable feature is that the most brightly coloured forms occur in the extreme eastern and western limits of the distribution of the genus—*cleopatra* and *cleobule* in the west and *amintha* in the east. And we may observe that *cleopatra*, subsp. *maderensis*, from Madeira, has an orange suffusion almost as extensive as that of *cleobule*, while the eastern *cleopatra*, from Asia Minor, have a much reduced suffusion and have been mistaken for hybrids between *cleopatra* and *rhamni*. The suggested occurrence of *cleopatra* at Vladivostock (one example, subsp. *orientalis*) appears to me to place an undue strain on human credulity. In Japan, with *amintha*, occur parallel forms of *acuminata* and *rhamni*.

A third feature which seems noteworthy is the number of forms, be they species or subspecies, which occur in Northern India and Burma and in the countries immediately to the north. I do not think that more distinct forms are to be found together here than elsewhere, but there is a remarkable assemblage of obscure forms of a very limited distribution in this area.

On the variation I do not propose to say much. It is well known, of course, that in *rhamni* and *cleopatra* gynandromorphs occur more commonly than in most butterflies, and a great number of each species has been recorded, a few halved, but the majority a mosaic of the two sexes. Apart from these two I know of one gynandromorph of *acuminata* and two of *amintha*, one of which is halved.

A widespread form of variation is the assumption by one sex of the coloration of the other. In *rhamni*, for example, a ♀ form approaching ♂ coloration, ab. *intermedia*, Tutt, is well known. In Japan and Burma wholly yellow ♀♀ occur, in Japan sporadically (subsp. *maxima*, ab. *mascula*, Verity), and in Burma as the only known ♀ of subsp. *burmensis*.

In *amintha* there is a remarkable ♀ form, ab. *mascula*, Verity, in which the insect is of a deep and dull yellow, but quite distinct from ♂ *amintha*, as the corresponding Japanese aberration of *rhamni* is distinct from ♂ *maxima*.

Per contra, Leech ("Butts. China," 441) says he has male *rhamni* of female coloration.

Throughout the genus (except in *cleobule*) the females are normally creamy or greenish-white, and they have a remarkable similarity. I cannot help thinking that this is the ancestral or original colouring of both sexes, and that traces of it survive in the male, extensive in *chitralensis* and less extensive in *aspasia*, *alvinda*, and *zaneka*. The males (as we suppose to have happened in other butterflies) have developed brighter colouring, and at an early stage in the development of the genus the uniformly yellow male must have been evolved, as we know it to-day in *rhamni*, *acuminata* and *farinosa*.

If we now, surveying the world from our imaginary height, assume the evolution of the genus to have commenced with a species not unlike *chitralensis*, flying somewhere near the present habitat of that species, I believe we shall see a picture which is intelligible. Let me first remark that in allied genera, e.g., in *Catopsilia* and *Phorbis*, this coloration is known.

From a form like *chitralensis* having a limited distribution in Northern India one can imagine the evolution of *rhamni* and *farinosa*, with the coloration we now regard as typical of the genus, and of *aspasia* and *alvinda*, retaining the white hindwing but now tending to lose it. One can imagine the quaint little offshoots from the line of ascent, which have evolved into *zaneka* and *zanekoides*, and one can picture the appearance of even more richly coloured forms as the evolving species spread further east and further west, so that *amintha*, *acuminata* ab. *niphonica*, and *rhamni* subsp. *maxima* appear in the far east and *cleopatra* and *cleobule* in the far west. On this supposition the two last mentioned would seem to have evolved directly or indirectly from *rhamni*, and it would be consistent with such a supposition that the forms of *cleopatra* with very little orange suffusion continue to exist in the eastern part of its range.

I call your attention to the form of *rhamni* from Spain, which Dr Cockayne took during the last dispute with Germany and which he kindly gave me. I do not think this deeply tinted form is described, and it is certainly suggestive of some of the far eastern forms. I know of no form of *rhamni* so deeply coloured except in the east, so that in this species, as in the genus, the brightest forms occur at the extreme limits of the distribution.

I have taken you on a voyage which has extended beyond our usual radius of activity, but I hope this rather sketchy introduction to a difficult genus has not been entirely without interest to you.

ORTHOLITHA UMBRIFERA, PROUT, AND O. SCOTICA SP. NOV.
TWO NEW BRITISH SPECIES OF LEPIDOPTERA
 (GEOMETRIDAE).
 (With Plate IV.)

By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.

Read 9th March 1939.

Many years ago Mr E. E. Green showed some very small specimens, with two discoidal spots instead of one, and suggested that they might belong to a species distinct from *Ortholitha mucronata*, Scop. (*palumbaria*, Schiff.; *plumbaria*, F.), though closely resembling it. His material, from Eggerdon Hill, Dorset, was scanty, and Dr Karl Jordan and Mr Tams who examined the male genitalia, arrived at no definite conclusion. Mr Russell James ("Ent. Record," 1912, xxiv, 258) in an account of a visit to Braemar said "that when he arrived on 29th June *Eubolia plumbaria*, F. (as the composite species was then known to him) was plentiful, but the males were worn to shreds and the females needed picking over. By the end of his visit on 17th July the earlier emergence had vanished, but a fresh lot of both sexes had appeared. These were strongly coloured and of considerably larger size than the early ones." I gathered in a conversation with him recently that he had always thought there might be two species. In 1931 I went to Braemar and, collecting over the same ground, took a good series of the early form and brought worn specimens of both sexes for examination. I caught the first specimen on 12th June and by 16th June they had become common, but by the time I left on 29th June they were nearly over, and the late form had not yet appeared.

At Rannoch I have observed the two emergences on the same ground. The dark form emerged about a month later than the light one.

Comparing the two forms, I was convinced that we had two species differing in many respects. On examination the genitalia proved to be variable, but I found differences which I thought were constant. Mr Tams, supplied with some of my material, agreed with me, and his photographs showed other differences, those in the females being very obvious.

Mr L. B. Prout is satisfied that *mucronata*, Scop., *palumbaria*, Schiff., and *plumbaria*, F., are synonyms for the late species. The type of ab. *umbrifera*, Prout ("Seitz," iv, p. 158, 1914; and "Seitz Supplement," iv, p. 74, fig. t. 7f), a female that was taken in Epping Forest on 9th May 1896, has been examined by Mr Tams and found to have genitalia (Pl. IV, figs. 1a and 1b) like those of the female figured by Pierce as *mucronata* in his Genitalia of the British

Geometridae, but unlike those of the true *mucronata* (Pl. IV, figs. 3a and 3b). *Ortholitha umbrifera*, Prout, must, therefore, be raised to specific rank. The male genitalia figured by Pierce are also those of *umbrifera*.

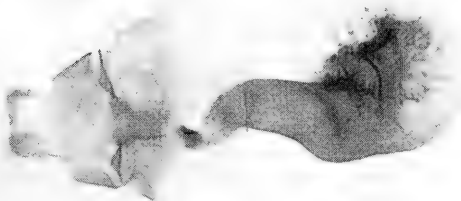
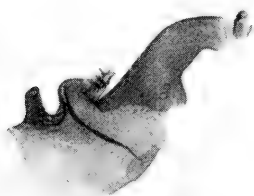
My Scottish specimens, taken in June at Braemar and Rannoch, agree neither with *mucronata* nor *umbrifera* and must be regarded as a third species. For this I propose the name **scotica**, sp. nov.

Comparing specimens of *scotica* and *mucronata* from Braemar, and from Rannoch, the former is rather smaller with narrower and more pointed wings. The discoidal spot is larger and sometimes separated into two. The basal line is more oblique. In well-marked specimens the antemedian runs from the costa towards the base as far as the subcostal nervure, whereas in *mucronata* it runs towards the apex; it then runs in a curve with concavity towards base as far as the median nervure, and then in another curve to the inner margin, whereas in *mucronata* it runs less obliquely and is very straight. The postmedian line in *scotica* is also more oblique and more wavy. In two of my specimens the basal and antemedian lines are united along the subcostal and median nervures so as to form a circular marking in the cell.

In the male of *scotica* the costa of the valve is thicker and broader at the end, and proximal to the end it is expanded posteriorly, whereas in *mucronata* there is no posterior expansion. The uncus is shorter and straighter, and the base of the uncus and tegumen form a triangle; in *mucronata* there are projecting shoulders at the base of the uncus. The aedoeagus is shorter in *scotica*, the part proximal to the entry of the ductus being reduced in length. The female genitalia show great differences from every aspect. In *scotica* the ductus bursae is narrower and straighter and lacks the conspicuous spiral twist present in the ductus of *mucronata*. The spines on the ductus of *scotica* are smaller and have a different arrangement. At the distal end of the ductus of *scotica* there is a small sharp hook; in *mucronata* the hook is very much longer, broader, and blunter, and it is bent more sharply so that it can only be seen from the right lateral aspect. On the inner surface of the bursa copulatrix of *scotica* there are a number of very small spines, on that of *mucronata* the spines are very much larger and more numerous. In addition there are several other differences in structure (Pl. IV, figs. 2a and 2b).

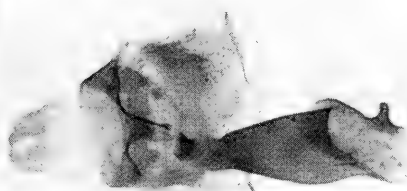
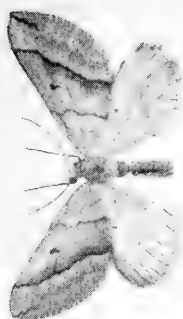
To sum up, *scotica* differs from *mucronata* in shape, size, colour and markings. The structure of the male genitalia shows several small differences from those of *mucronata*, and that of the female genitalia shows many large and striking differences. On the same ground the beginning of its emergence occurs a month before that of *mucronata*.

It differs from typical *umbrifera* in having a paler and more silvery ground colour and in the absence, except in rare cases, of dark shading internal to the postmedian line. The part of the antemedian between the costa and the subcostal nervure in *umbrifera* runs at right angles to the costa instead of towards the base as in *scotica* or towards the apex



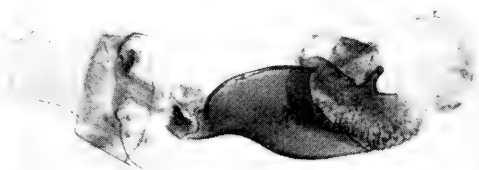
3a. *Ortholotha micronota*, Scop.

3b. ♀ genitalia.



2a. *Ortholotha scotica*, n. sp., ♂.

2b. ♀ genitalia.



1a. *Ortholotha umbrifera*, Prout, ♀.

1b. ♀ genitalia.

as in *mucronata*. The female genitalia also differ; the spines inside the bursa copulatrix of typical *umbrifera* are more numerous and much larger than those of *scotica*, though neither so large nor so numerous as those of *mucronata*. In other respects the female genitalia of *scotica* are similar to those of typical *umbrifera* though very much smaller and the short sharp hook present on both makes it easy to distinguish them from those of *mucronata*.

My grateful thanks are due to Mr Tams of the British Museum (Nat. Hist.) for the photographs and for his advice and help.

Holotype ♀ and allotype ♂, Braemar, 1931, in my collection.

INTRODUCTION TO A DISCUSSION ON "SUGARING."

By C. G. M. DE WORMS, Ph.D., F.R.E.S.—Read 13th April 1939.

Ever since "sugaring" was discovered some hundred years ago, it has formed one of the most popular and effective methods for attracting and collecting Lepidoptera. But though all of us who are keen on field methods have probably watched this procedure time and again, it still remains wrapt in mystery, chiefly, as regards the underlying factors which influence the insects visiting our bait. In these somewhat brief introductory remarks to an absorbing subject, I propose to deal with many of my own experiences and observations and to make deductions from them which may help to throw some light on the many phenomena with which we are familiar.

As we know, there are what we call "good" and "bad" nights for sugaring. On some occasions insects will swarm at the patches and on others that would appear equally favourable, there is a very scanty attendance. Though at first sight scent would seem to be the all-important factor, there are many others, the full significance of which is difficult to explain. For instance, sugaring as a rule has its cycles. For a period, perhaps of several weeks, moths will not be attracted and then, suddenly, they will come in large numbers night after night. I think there can be little doubt that the sugar patch comes into its own when there is lack of other scented forms of attractions, such as swallow bloom, ivy, flowers and honeydew. These two last are usually most effective in dry, warm weather when the exudation of honey is greatest. When this is the case, sugaring generally proves of very little use. It is mainly in moist atmospheric conditions that sugar is at its best. This brings me to say something about the very important part that weather in general plays in the productiveness or otherwise of sugaring. Though it is extremely difficult, indeed well nigh impossible, to prognosticate with accuracy how any particular night will turn out, there are many noteworthy guides and omens, good or bad.

Temperature is doubtless among the leading factors, together with humidity and the direction of the wind. A combination of all three in the right degrees of each may provide us with a clue to the ideal conditions for sugaring. We are all familiar with the usual sparseness of insects on really cold nights. There seems to be a minimum temperature below which moths will seldom turn out. On warm evenings when the thermometer drops rapidly after dark, insects appear perhaps on the patches immediately after dusk and then disappear very soon afterwards. On the other hand, I have often known a night start cool, when a subsequent rise in temperature was followed by a sudden arrival of moths at sugar. Humidity is a much more important factor than we

may imagine. Usually the best sugaring nights occur when there is rain or a tendency to it coupled with mild conditions. Again, the intensity and the direction of the wind have a very great effect. We very seldom obtain much of a "bag" with the wind from the north or east, as a nip in the air is as a rule associated with both these quarters. A gentle south-west breeze generally accompanies the best results in sugaring. A moon does not necessarily interfere, as I well remember an extremely good period during a full moon and clear sky. Dew and light fog are two of the main bugbears against a successful haul.

I have already referred to the fact of sugaring running in cycles, and this leads up to a consideration of localities and seasons. Many people consider that some periods of the year are appreciably better than others. For instance, they hold that during the spring, when the sallow is attractive, it is hardly worth putting on sugar. This is by no means always so. I well remember a remarkable attendance, including over 100 *Taenioctampa munda*, Esp., on an April night when the sallows were fully out and not a single insect was on the bloom. Often during dry, hot weather in June and July sugar may be very unproductive, while I have known unsettled conditions in August and September bring an amazing abundance of moths to the patches. This was very marked in 1938, when night after night they came in almost thousands.

As regards localities, I have usually found that the more open and exposed situations are the most productive. I have often tested this by sugaring in a wood and on its outskirts and the latter has almost always turned out the better. This can be well inferred, since, especially on still nights, the scent is much more effectively diffused in an open spot. As to the possible advantage of continuously working the same line or round of patches, I am somewhat dubious. True, if a row of posts is continually sugared, the visitors on one night may reappear the next one, since they have probably not gone far, but most of us must have often found that a locality which has never been worked before may provide a huge catch the very first time of trying. This was certainly so on an occasion in the Lake District when every patch is a spot never before tried was smothered with moths.

Methods and times of sugaring are of importance. One of the main purposes in the process is to get the smell well spread. For this purpose spraying the mixture on foliage, where possible, is often of much advantage as against merely daubing it on in streaks on posts, trunks or twigs. Again, flowerheads, well sprinkled, are usually more attractive to coastal species. Most of us make a point of putting on the mixture about half-an-hour before dusk. On most nights this procedure is certainly essential since many species have a dusk flight and it is while on this excursion that they seek out some form of scent attraction which may provide them with an occupation and resting site for the remaining hours of darkness. I have, however, known occasions when sugaring well after dark has attracted insects, but this, as a rule, is only when the temperature rises during the night.

Now as to the various concoctions we make for our "sugar." Much has been written on this and any number of recipes suggested. So long as the mixture is distinctly sweet and has a powerful and pleasing odour, I think that little else matters. As flavouring ingredients I have tried essence of pear, rum, methylated spirit, and even chloroform, and all seemed equally effective. The inclusion of some intoxicating liquid is always advantageous for keeping the insects on the patches. Pure honey has proved very attractive to the *Plusia* family, which does not usually patronise treacle.

This leads me to say something in conclusion about the various families of Moths which come to sugar and their respective behaviour. By far the largest group, as we well know, is to be found among the true Noctuids, though sometimes we may have a visit from Geometers, an occasional Hawk-moth, such as *elpenor*, and even the "Footman" family. Most species have well-defined habits. We are familiar with the skittishness of the "Lutestrings" and the *Thyatira*. Many others, such as *Diphthera orion*, turn up regularly at quite a late hour on warm nights, whereas most of the true Noctuids start appearing soon after dusk and will increase in numbers as the night goes on so long as conditions are right.

In the above remarks I have endeavoured to give an outline of the points involved and to emphasise from observation the main factors governing this fascinating pastime which brings with it expectation, enjoyment, disappointments, and is, above all, a field for perseverance and research.

HYBRIDS.

By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.—Read 22nd June 1939.

At one time it was believed that all hybrids were infertile, but it is now recognized that all degrees of fertility may exist. As a general rule the less closely related are the two parent species the more infertile are the hybrids, but there are exceptions, for some of the bigeneric Bistonine and Sphingid hybrids have males, which are partially fertile, and crosses between some of the different races of *Laothoë* (*Amorpha*) *populi* give females, which are quite infertile. Many female hybrids have aborted ovaries containing no eggs at all or only a few abnormal ones and the accessory organs may be ill developed or in part missing, whereas in male hybrids the testes are usually well formed and spermatogenesis is often normal. This is the main reason why so many female hybrids are infertile while their males are fertile. Even the hybrid *Smerinthus ocellatus* ♂ × *Laothoë* (*A.*) *populi* ♀, which according to Roepke usually has no normal spermatozoa, has on one occasion, with a female *populi* as the other parent, produced a secondary hybrid, of which two males were bred by Müller.

Failure to obtain a hybrid depends on a variety of causes. In some cases no pairing can be obtained in spite of the close relationship of the two species. This is the case with *Hydriomena coerulea* and *H. ruberata*. In others there is an anatomical obstacle; for instance, *Valeria oleagina*, F. ♂ × *V. jaspidea*, Vill. ♀ has produced male offspring on several occasions, but the reciprocal cross is unsuccessful because the bursa copulatrix is damaged in copulation. Another cause of failure is inability to separate after pairing, which according to Newman occurred with some species of *Cosymbia* and with the only pairing I obtained between *Cabera exanthemata* ♂ and *C. pusaria* ♀. Disparity in the size of the two species may be the cause. The male *Lycia hirtaria* in numerous pairings obtained by Harrison failed to hold the female *Pocilopsis lapponaria* long enough to ensure successful copulation. The only fertile pairing he got in 1916 lasted two days, and even then only half the eggs were fertilized ("Journ. Genetics," 1916, 6, 95). The male *Nyssia* (*Ithysia*) *zonaria*, owing to its small size, often finds great difficulty in pairing with the female *Lycia hirtaria*. In most cases, however, the cause of failure is more fundamental, though it does not appear to depend on inability of the chromosomes to conjugate. It may be due to lack of harmony between the cytoplasm of the female and the chromosomes of the male parent.

A curious feature in hybrids is that in some cases the sexes emerge at different dates. In the one brood of *Notodonta ziczac* ♂ × *N. drome-*

darius ♀ all the sixteen females emerged in the autumn of 1904 and all the eighteen males in three batches from April to July 1905 ("Entomologist," 1905, 38, 262). Bacot found that with *Malacosoma neustria* ♂ × *M. castrensis* ♀ the females fed fast and emerged weeks ahead of the males leaving a gap of three weeks between the last female and the first male ("Ent. Record," 1902, 14, 106). With *Oporinia dilutata* ♂ × *O. autumnata* ♀ Harrison found that females emerged soon after pupation in June and July, but all the males emerged in October ("Entomologist," 1915, 48, 1). Of my brood of *Ectropis bistortata* (Scottish) ♂ × *E. crepuscularia* ♀ eleven females resembling the female parent emerged the same year and five males and one female resembling the male parent emerged the following spring ("Ent. Record," 1909, 21, 125). Harrison has confirmed this and says that while the emergence of both sexes may be accelerated even by some months the females often emerge some weeks before the males. It is not always the female that develops quickly for Standfuss found that with *Clostera curtula* ♂ × *C. anachoreta* ♀ the males fed with great speed, emerged in June, and paired with *anachoreta*. These secondary hybrid larvae fed rapidly and all produced males in August. Paired with female *anachoreta* the larvae were feeding alongside the female larvae of the primary hybrid and again produced males ("Entomologist," 1900, 34, 78).

The males of the hybrid *Drepana falcataria* ♂ × *D. curvatula* ♀ developed at once, but the females passed the winter in the pupal stage, though in the case of the reciprocal hybrid both sexes emerged together. The rapid development of one sex is not always constant, for in *Clostera curtula* ♂ × *C. pigra* ♀ bred by Standfuss the males developed much more quickly than the females, but in a brood reared by Newman 240 pupated, and 3 males and 11 females emerged in August, the other males and females passing the winter as pupae. In one brood of *Lycia hirtaria* ♂ × *Poecilopsis pomonaria* ♀ the females emerged the first year, but all the males emerged the second year, having passed two winters in the pupal state, whereas in another brood both sexes emerged together.

Many hybrids develop more quickly than either parent. The eggs of Worsley-Wood's *Xanthia ocellaris* ♂ × *X. fulvago* ♀ hatched in the winter instead of waiting until the spring. The hybrid *S. ocellatus* ♂ × *L. (A.) populi* ♀ emerges in the same year, as *populi* sometimes does, and as a rule pupae that pass the winter die in the spring. The imagines of *Palimpsestis octogesima* ♂ × *P. or* ♀ emerged in the autumn of the same year. Of Chapman's *Biston strataria* ♂ × *B. betularia* ♀ six omitted a moult, pupated earlier than the others, and emerged during the winter, the bulk became diseased and died and only a dozen of them pupated. As they showed no sign of development an attempt was made to force them and only one or two survived and lay over for a second winter.

In the case of many hybrids it is much more difficult to get the cross one way than the other; for instance, the pairings *Selenia tetralunaria*

♂ × *S. bilunaria* ♀ and *Clostera curtula* ♂ × *C. pigra* ♀ are harder to get than the reciprocal pairings, though both are equally fertile. In other cases one cross is much more infertile than the other, though it may be no more difficult to obtain. Harrison says that *Laotioë* (*Amorpha*) *populi* males pair more readily with females of *Smerinthus ocellatus* than with their own species, but in his experience the ova have always proved infertile, whereas the reverse cross is extremely difficult to get, but the ova are very fertile. With *Oporinia* hybrids, whether primary or secondary, when *dilutata* is the female parent there is a very high mortality in the pupal stage, so that in the primary cross with *autumnata* as the male parent only two per cent. produce imagines. On the other hand, in the corresponding crosses, both primary and secondary, with *autumnata* as the female parent fertility is high. For instance, *O. dilutata* ♂ × *O. autumnata* ♀ gives 100 per cent. fertile eggs and with care there is no mortality in the larval or pupal stages. *Oporinia filigrammaria*, however, behaves differently from its close ally *autumnata*. The cross *filigrammaria* ♂ × *dilutata* ♀ is infertile, and from the reciprocal cross only 19 out of 97 eggs were fertile and all the larvae died ("Journ. Genetics," 1920, 9, 196).

The genus *Cosymbia* is divided on the genitalia into two sections, *porata*, *punctaria*, and *linearia* falling into section I, and *annulata*, *pendularia*, and *orbicularia* into section II. All the possible crosses between members of section II have been obtained, though those between *orbicularia* and *annulata* were very infertile. In Head's first experiments with *orbicularia* as the male parent only one cripple was bred, but he must have been more successful later for I have two males bred in 1931. No successful cross has been obtained between any of the members of section I, and only two between members of different sections. *C. orbicularia* ♂ × *C. linearia* ♀ has produced imagines and *C. orbicularia* ♂ × *C. porata* ♀ gave healthy larvae, which attained full growth, but died from neglect.

ABNORMAL SEX RATIOS.

A fairly common phenomenon in hybrids is an abnormal sex ratio. In some cases one cross produces nothing but males, while the reciprocal cross gives equal numbers of males and females. Lepidoptera conform with Haldane's Law, which applies both to vertebrates and invertebrates, that when one sex of a hybrid is rare or absent it is the heterogametic sex (the sex that has only one X-chromosome). The cause of the phenomenon is that the X-chromosome, which carries the male determining factor, may differ in valency in different species, particularly in those belonging to different genera. Sex depends on the balance between the X-chromosomes on the one hand and the autosomes (ordinary paired chromosomes) and cytoplasm on the other. When the valency of the X-chromosome of the male parent in a lepidopteron greatly exceeds that of the female parent, the moths which have only one X and should be females are transformed into males, while those with two

X-chromosomes are made more masculine. *Lycia hirtaria* ♂ × *Nyssia* (*Ithysia*) *zonaria* ♀ has never yet produced a female, though hundreds of males have been bred, and *Poecilopsis lapponaria* ♂ × *N. (S.) zonaria* ♀ has so far only produced four females, one of which I bred in 1911. The hybrid *Ectropis crepuscularia* ♂ × *bistortata* ♀ usually produces males and in all the recorded broods the ratio of males to females is 959:8, and in some of the secondary hybrids there is a great excess of males. Of the hybrid *Oporinia autumnata* ♂ × *O. dilutata* ♀ only three females have been bred, and though 98 per cent. die in the pupal stage they are all males. The list could be extended greatly, if hybrids, of which one or both parents are non-British species, were included.

Smerinthus ocellatus ♂ × *Laothö* (*Amorpha*) *populi* ♀ usually gives only male offspring, but occasionally a few apparent females are present in a brood. Careful examination shows that these are intersexes and their external genitalia consist of a mosaic of male and female structures. Every gradation exists from those almost wholly male at one end of the series to those almost wholly female at the other end. They are rare, for of thousands bred only two per cent. are intersexes. *Clostera anachoreta* ♂ × *C. curtula* ♀ is another example, for one brood consisted of 21 males, 2 females, and 3 intersexes and a single intersex appeared in another brood ("Insektenbörse," 1899, 177).

GYNANDROMORPHS.

Intersexes must not be confused with gynandromorphs, of which several halved examples have been recorded in *Smerinthus ocellatus* ♂ × *Laothö* (*Amorpha*) *populi* ♀. These arise from binucleate eggs, each nucleus of which is fertilized by a separate spermatozoon. As one would expect they occurred together with intersexes in the only two broods of which the exact composition is recorded, and it is probable that the female side is really intersexual, though there were no male structures in the external genitalia on the female side of the one I dissected. One of the recorded broods bred by Zambra in October and November 1912 consisted of 25 males, 10 intersexes, and 2 gynandromorphs, the other bred by Whicher consisted of 13 males, 3 intersexes, and 2 halved gynandromorphs, one of which was crippled. The males emerged between August 18 and September 1, and the intersexes and gynandromorphs between September 25, 1914, and March 23, 1915, which is remarkable because pupae that pass the winter seldom produce imagines. I recorded these two broods as bred by Newman ("Trans. Ent. Soc. Lond.," 1935, 83, 514) and thought wrongly that Whicher's, in which the cripple was not counted, was another one. The female *populi* in both cases were from Newman's strain, which produced gynandromorphs not infrequently.

Haynes ("Ent. Record," 1914, 26, 126) records a brood of *Selenia tetralunaria* ♂ × *S. bilunaria* ♀, in which there was a "large preponderance of gynandromorphs." No further description is given, but

since this and the reciprocal cross usually give normal sex ratios they may have been true gynandromorphs. Worsley-Wood once bred a female hybrid, *Nyssia (Ithysia) zonaria* ♂ × *Lycia hirtaria* ♀, with the left antenna almost as well pectinated as that of a male, a condition probably due to non-disjunction.

In the case of secondary hybrids also abnormal sex ratios occur and intersexes replace females with greater frequency. Harrison ("Entomologist," 1938, 71, 124) says that the males of both hybrids between *Poecilopsis lapponaria* and *Lycia hirtaria* crossed with female *hirtaria* give males and intersexes, the latter replacing females, and that the male hybrid *Oporinia (dilatata)* ♂ × *autumnata* ♀ whether paired with female *dilatata* or *autumnata* also gives intersexes instead of females ("Genetica," 1933, 15, 115). Many other cases are known in Saturniid and Bistonine secondary hybrids, of which one or both parents are not British species. The cause of the intersexuality is more complex than in primary hybrids. If the sex chromosomes do not pair there will be either 3 X or 2 X and 1 Y to 3 sets of autosomes. In the latter case the ratio of X-chromosomes to autosomes will be 1:1.5 in place of 1:1, which gives a male, or 1:2, which gives a female, and an intersex results. Actually some autosomes conjugate and this affects the ratio. The number of unconjugated chromosomes may vary in different cells increasing or decreasing the tendency to masculinity, and if the valency of the X-chromosomes of the parent species differs this also influences the sex. A more detailed explanation is given in "Biological Reviews" (1938, 13, 107).

This is by no means the only way in which an abnormal sex ratio can be produced. The weakness in the male larvae of *Malacosoma neustria* ♂ × *M. castrensis* ♀ leads to a preponderance of female imagines. *Cymatophora octogesima* ♂ × *C. or* ♀ gave a brood of 33 females, but no account was given of the stage at which the males died.

Bytinski-Salz and Günther ("Zeitschr. Indukt. Abstamm. u. Vererb.-Lehre," 1930, 53, 153) say that of the hybrid *Celerio gallii* ♂ × *C. euphorbiae* ♀ 1000 males and only 10 females have been bred. The female are as numerous as the male pupae, but after passing one and sometimes two or three winters they die. No females are known of the following hybrids: *gallii* ♂ × *euphorbiae*, ssp. *mauritanica* ♀, *gallii* ♂ × *euphorbiae*, ssp. *dahli* ♀, *gallii* ♂ × *livornica* ♀, *livornica* ♂ × *elpenor* ♀, and *porcellus* ♂ × *euphorbiae* ♀, and only five females of *porcellus* ♂ × *elpenor* ♀. As in the first case there are as many female as male pupae, but they die in the spring. In the reciprocal crosses equal numbers of the two sexes emerge. Of the secondary hybrids, *galiphorbiae* ♂ × *gallii* ♀, half the female pupae produce moths and half die in the spring, and of the hybrid *galiphorbiae* ♂ × *euphorbiae* ♀ 26 males and 13 females emerged the same year, and of 15 female pupae that passed the winter only one emerged.

The explanation given is that there is a disharmony between the X-chromosome of the male parent and the Y-chromosome of the female

parent, a theory which is confirmed by the ratios in the secondary hybrids. The females of *galiphorbiae* ♂ × *gallii* ♀ will be of two kinds, those with both X and Y derived from *gallii* and those with the X from *euphorbiae* and the Y from *gallii*, the former survive and the latter die. The females of the other secondary hybrid which survive will derive both sex chromosomes from *euphorbiae*, and those which die receive the X from *gallii* and the Y from *euphorbiae*.

Mimas tiliae ♂ × *Smerinthus ocellatus* ♀ has, so far as I can ascertain, never produced a female, though many broods have been reared. This may be due to the different valency of the X-chromosomes. In a large number of other hybrids only a few males have been bred, as in *Epione vespertaria* ♂ × *E. repandaria* ♀, but only breeding on a larger scale will show whether this was mere chance or whether the sex ratio is really abnormal.

PARTHENOGENESIS.

Though rare in hybrids Harrison believes that parthenogenesis is caused by hybridization. In 1920 ("Journ. Genetics," 1920, 10, 77) he bred moths from five virgin hybrid females, three being *Ectropis crepuscularia* ♂ × *bistortata* ♀, one the reciprocal hybrid, and one *E. (crepuscularia* ♂ × *bistortata* ♀) ♂ × (*bistortata* ♂ × *crepuscularia* ♀) ♀. With the exception of one of the primary hybrids the *crepuscularia* were ab. *delamerensis*. Harrison and Peacock ("Trans. N.H. Soc. Northumb.," 1926, 6, 201) obtained fertile eggs from a virgin female *E. bistortata* ♂ × *E. crepuscularia* ab. *delamerensis* ♀ and bred two males and a female. They also bred two black moths from a virgin hybrid *E. bistortata* ab. *defessaria*, Frr. ♂ × *E. crepuscularia* ♀.

From a pairing of *Selenia tetralunaria* ♂ × *S. bilunaria* ♀ Harrison obtained males that were obviously hybrid and six females that were in appearance pure *bilunaria*. Four of these paired with male *bilunaria* and all laid fertile eggs. Two broods were brought to maturity and both males and females appeared to be *bilunaria*. Cytological examination showed that they had 60 chromosomes, the haploid number of *bilunaria* being 30 and of *tetralunaria* 29. He thinks that the six females were produced parthenogenetically under the stimulus of *tetralunaria* sperm, and calls it an example of expedited parthenogenesis ("Journ. Genetics," 1933, 27, 225).

PROTHETELY.

From a pairing of *Oporinia dilutata* ♂ × *O. autumnata* ♀ fourteen larvae in the fourth instar after feeding normally spun pads of silk and remained motionless for a fortnight. Thirteen died, but the fourteenth moulted after five weeks, and showed a mixture of larval and imaginal characters. The head was very small with antennae longer and eyes reticulated and larger than normal; the legs were intermediate, and there were rudimentary wings on the meso- and meta-thorax. Such premature and abnormal development is very rare in pure species, and Harrison thinks that in this case hybridity was a factor in its causation.

QUADRISPECIFIC HYBRID.

The hybrid in which the largest number of species take part appears to be hybr. *interfauna* Harrison, *Poecilopsis* [(*pomonaria* ♂ × *lapponaria* ♀) ♂ × (*pomonaria* ♂ × *isabellae* ♀) ♀] ♂ × *rachelae* ♀ ("Entomologist," 1916, 49, 76).

There is one trigenic hybrid, if the classification of Rothschild and Jordan be accepted, in which *Pergesa elpenor*, *Metopsilus porcellus*, and *Celerio euphorbiae* take part, but it is usual now to include the first two in *Pergesa*.

CYTOLOGY.

Bytinski-Salz ("Biol. Zentralbl.," 1934, 54, 300) has studied the behaviour of the chromosomes in hybrids of *Celerio* and *Pergesa*, of which all the species have 29, and has placed them in three classes.

I. Hybrids with 29 chromosomes showing complete affinity. *C. euphorbiae* ♂ × *C. gallii* ♀, *gallii* ♂ × *euphorbiae* ♀, and their back crosses, *euphorbiae* ♂ × *hippophaes* ♀, *hippophaes* ♂ × *euphorbiae* ♀, and the back cross with *euphorbiae*, *vespertilio* ♂ × *euphorbiae* ♀, *P. elpenor* ♂ × *porcellus* ♀, *porcellus* ♂ × *elpenor* ♀.

II. Hybrids with partial affinity (38-42, average 39 chromosomes). *C. livornica* ♂ × *C. euphorbiae* ♀, *euphorbiae* ♂ × *livornica* ♀, *livornica* ♂ × *gallii* ♀, *gallii* ♂ × *livornica* ♀.

III. Hybrids with very little affinity of chromosomes, in which a variable but small number, about 4 or 5, conjugate. Crosses between *Celerio* and *Pergesa*, *euphorbiae* ♂ × *elpenor* ♀, *elpenor* ♂ × *euphorbiae* ♀, *gallii* ♂ × *elpenor* ♀, *livornica* ♂ × *elpenor* ♀, *euphorbiae* ♂ × *porcellus* ♀, *gallii* ♂ × *porcellus* ♀.

Federley working with *Clostera curtula* and *C. anachoreta*, each with 59 chromosomes, finds that in the hybrid *curtula* ♂ × *anachoreta* ♀ only two or three chromosomes conjugate, and the secondary hybrid with *anachoreta* ♀ is triploid. More or less complete failure of conjugation also occurs in other *Clostera* hybrids. In *Mimas tiliae* ♂ × *Smerinthus ocellatus* ♀ no chromosomes conjugate and in *S. ocellatus* ♂ × *L. (A.) populi* ♀ this is usually the case, but occasionally one chromosome conjugates. In primary hybrids between *Oporinia filigrammaria* and *autumnata* the great majority and occasionally all the chromosomes conjugate, but in *Oporinia dilutata* ♂ × *autumnata* ♀, according to Harrison, no conjugation of chromosomes takes place, the primary hybrid having 68, 30 from *dilutata* and 38 from *autumnata*, and the secondary hybrid with *dilutata* ♀ is a triploid with 98 (30 + 30 + 38). In the primary hybrid, *Saturnia pavonia* ♂ × *pyri* ♀, with 29 and 30 chromosomes respectively, there is little or no conjugation and the secondary hybrid with a female of *pavonia* or *pyri* is triploid. In the case of hybrids between *Ectopis crepuscularia* and *E. histortata*, Harrison finds that many chromosomes fail to conjugate and some are lost in the cytoplasm, which is surprising in view of their fertility. In the Bistonine hybrids there is affinity between the majority of the chromosomes in some, and in others almost

complete lack of affinity, the degree of affinity and the degree of relationship of the parent species showing a close correspondence. The chromosome numbers, however, differ greatly. *Lycia hirtaria* has 28 large ones and *Poecilopsis pomonaria* 100 small ones. In the hybrid the total number is less than it would be if each *hirtaria* chromosome conjugated with a *pomonaria* chromosome, and it is probable that it conjugates with more than one. Federley confirms the complete affinity between the chromosomes of *Pergesa elpenor* and *P. porcellus*, and finds that in the hybrid *Epicnapteryx ilicifolia*, L. ♂ \times *tremulifolia*, Hb. ♀ every chromosome conjugates.

He considers that the degree of affinity of the chromosomes is a good indication of the degree of relationship. If this is true *P. porcellus* and *P. elpenor*, placed in separate genera by some systematists, are more closely related than *Laotoö (A.) populi* and its subspecies *austati*, Stgr., in which 1 to 5 chromosomes fail to conjugate, or *Smerinthus ocellatus* and ssp. *planus*, Wlk., in which the affinity is still less.

MENDELIAN SEGREGATION IN HYBRIDS.

Very little is known about the behaviour of unit characters in hybridization. Chapman crossed *Biston strataria* ♂ \times *B. betularia*, ab. *carbonaria* ♀, the dominant melanic form, but omits to mention whether any of the hybrids were melanic. Harrison, however, has done numerous crossings between *Ectropis bistortata* and *E. crepuscularia*, ab. *delamerensis*, which is another melanic dominant, and various secondary and more complex hybrids. In nearly all these experiments melanism was inherited exactly as in the pure species. Four exceptional broods occurred in which a mosaic form replaced some of the heterozygous melanics and this proved to be an allelomorph recessive to the melanic and dominant to the typical form. Though this mosaic form is well known in *crepuscularia* in a wild state it appears to have arisen anew by mutation in these hybrids ("Journ. Genetics," 1923, 13, 333). Some years later he introduced into similar crosses the melanic form of *E. bistortata*, ab. *defessaria*, Frr., which is recessive. He found that both the dominant and the recessive melanic forms were inherited quite independently, each behaving as a unit character and retaining their dominance and recessiveness as in pure *crepuscularia* and *bistortata*. The two melanic forms are not allelomorphs ("Genetica," 1932, 14, 151).

In an earlier experiment with melanic *crepuscularia* and typical *bistortata* two abnormal broods occurred in the F_2 generation, one showing such extraordinary variation that neither description (except of individuals) nor classification was possible, and an F_3 generation bred from them showed the same characteristics, the other showing variation of the same kind but to a less degree.

It is evident that in both species the gene for melanism lies in a chromosome that usually conjugates, otherwise mendelian segregation could not take place. An exceptional failure of the chromosome carrying the gene for *delamerensis* to conjugate would explain the appearance

of these abnormal broods, for irregular chromosome divisions and loss of chromosomes are known to occur in the primary hybrid.

Species differ from one another in a large number of genes, most of which produce comparatively small effects, and segregation, when it occurs, is more difficult to detect and analyse than in the case of unit characters such as melanism. If chromosomes do not conjugate both sets of parental genes will be present and a blending of characters will result even in the F_2 and later generations. In the F_1 generation blending will occur whether the chromosomes conjugate or not.

Bytinski-Salz says that *Celerio* and *Pergesa* in the larval, pupal, and imaginal stages differ in a great number of multifactorial characters, and, though in some cases there is clear evidence of mendelian segregation, a vast amount of work would be necessary for their genetical analysis.

Working with Günther ("Zeitschr. Indukt., Abstamm. u. Vererb.-Lehre," 1930, 53, 153) he found that the colour of the larval skin of *gallii* and *euphorbiae* in the first instar is bifactorial and in the various back crosses, *helenae*, *grossei*, and *zuerinai* shows perfect mendelian ratios. The black-green of *euphorbiae* is determined by two genes partially recessive to those determining the light green of *gallii*. Larvae heterozygous for either of these, but not for both, have an intermediate dark green skin. The size of the pulvillus and the antennal colour also showed very definite segregation in the back crosses.

Harrison ("Entomologist," 1916, 49, 79) says that mendelian segregation occurred with the following three hybrids, *Poecilopsis christianae* ♂ × *christianae* ♀, *P. (christianae* ♂ × *christianae* ♀) ♂ × *christianae* ♀, and *P. robsoni* ♂ × *robsoni* ♀, *christianae* being *pomonaria* ♂ × *isabellae* ♀ and *robsoni* being the reciprocal hybrid.

Federley ("Hereditas," 1927, 9, 391) working with the fertile hybrids of *Pergesa elpenor* and *porcellus* found that mendelian segregation occurred in the characters of the larva, pupa, and imago in the back crosses and more complex hybrids. Even the characters of the larval horn, which in 1923 he said did not segregate, have been shown with more material and more exact methods to obey the mendelian law.

As a result of his work on hybrid Lepidoptera Federley has formulated the following law, which he believes applies to all animals and plants:—"On the one hand conjugation of chromosomes, mendelian segregation, and fertility, and on the other hand lack of affinity of chromosomes, uniformity, and infertility go together" ("Handbuch der biologischen Arbeitsmethoden," 1929, Abt. 9, Teil 3, p. 679).

An exception to this law of uniformity occurs in some of the complicated hybrid Sphingids, in which it is said that there is a mosaic arrangement of colour and pattern. This may be due to a very irregular distribution of unconjugated chromosomes.

As an appendix I give two lists, the first comprising the British hybrids and the second the hybrids of species on the British list, but having one or both parents of Continental origin. All those in both

lists were from pairings effected in captivity with the exception of Pittman's *Monima* hybrid, the parents of which were found paired in a wild state. I have not included any reputed hybrids that have been captured. There is no doubt that such hybrids occur. *Smerinthus* hybr. *hybridus* has been taken at large in Germany and is unmistakable, both hybrids between *Pergesa elpenor* and *porcellus* are said to have been found wild, and there are good grounds for believing that hybr. *polonus* is a cross between *Lysandra bellargus* and *coridon*. The majority, however, are, in my opinion, aberrations of one or other of the supposed parent species. Stauder's hybrid *Zygaenas*, *achilleae* × *filipendulae* = hybr. *achillfilipendulae*, *meliloti* × *filipendulae* = hybr. *melilofilipendulae*, and *meliloti* × *achilleae* = hybr. *melilorestricta* may be authentic, but I am no more convinced of their authenticity, because they have been named, than I am of the authenticity of many others, the captors of which have been less daring. It is true that larvae were obtained from a wild pairing of *Z. filipendulae* ♂ × *achilleae* ♀, but unless imagines are reared or the larvae show clear indications of their hybrid parentage it is unsafe to accept such a case as genuine. Sometimes the female has been fertilized by a male of its own species before pairing a second time. The following two cases may be cited as a proof of this statement. Imagines bred from a female *Eupithecia lariciata*, Frr., found paired with a male *Acasis viretata*, Hb., were in external appearance pure *lariciata* and this was confirmed by examination of the genitalia. Similarly supposed hybrids from a pairing of *Leucoma salicis*, L., ♂ and *Porthesia chrysorrhoea* ♀ proved to be *chrysorrhoea*.

I have given no reference to the original descriptions of most of the hybrids included in Tutt's list ("Brit. Lepidopt.," 1906, vol. 5) or to those mentioned in Seitz ("Macrolepidoptera of the World"), but references to most of the others are appended.

BRITISH HYBRIDS.

Smerinthus ocellatus, L. ♂ × *Laothoë* (*Amorpha*) *populi*, L. ♀, hybr. *hybridus*, Steph.

Laothoë (*Amorpha*) *populi*, L. ♂ × *Smerinthus ocellatus*, L. ♀, hybr. *rothschildi*, Stndfs. (1).

Zygaena trifolii, Esp. ♂ × *filipendulae*, L. ♀, hybr. *escheri* Stndfs.

filipendulae, L. ♂ × *lonicerae*, Esp. ♀, hybr. *intermedia*, Tutt.

lonicerae, Esp. ♂ × *filipendulae*, L. ♀, hybr. *inversa*, Tutt.

trifolii, Esp. ♂ × *lonicerae*, Esp. ♀, hybr. *fletcheri*, Tutt.

lonicerae, Esp. ♂ × *trifolii*, Esp. ♀, hybr. *worthingi*, Tutt.

Malacosoma neustria, L. ♂ × *castrensis*, L. ♀, hybr. *neustrensis*, Klemann (2).

Cerura furcula, L. ♂ × *bicuspis*, Bkh. ♀, hybr. *furcuspis*, Bowater (3).

Notodonta ziczac, L. ♂ × *dromedarius*, L. ♀, hybr. *newmani*, Tutt (4).

Glostera curtula, L. ♂ × *pigra*, Hufn. ♀, hybr. *prima*, Tutt.

pigra, Hufn. ♂ × *curtula*, L. ♀, hybr. *inversa*, Tutt.

Cymatophora octogesima, Hb. ♂ × *or*, F. ♀, hybr. *fletcheri*, Tutt.

- Monima stabilis*, View. ♂ × *gothica*, L. ♀ (5).
- Xanthia ocellaris*, Borkh. ♂ × *fulvago*, L. ♀ (6).
- Cosymbia* (7) *pendularia*, Clrk. ♂ × *orbicularia*, Hb. ♀, hybr. *pendulo-orbicularia*, Tutt.
- orbicularia*, Hb. ♂ × *pendularia*, Clrk. ♀, hybr. *orbiculo-pendula*, Tutt.
- orbicularia*, Hb. ♂ × *linearia*, Hb. ♀, hybr. *brightoni*, Tutt.
- orbicularia*, Hb. ♂ × *annulata*, Schulze ♀, hybr. *headi*, Tutt.
- annulata*, Schulze ♂ × *orbicularia*, Hb. ♀.
- pendularia*, Clrk. ♂ × *annulata*, Schulze ♀.
- annulata*, Schulze ♂ × *pendularia*, Clrk. ♀ (8).
- (*orbicularia*, Hb. ♂ × *porata*, F. ♀) larvae died full grown.
- Oporinia dilutata*, Schiff. ♂ × *christyi*, Prout ♀.
- christyi*, Prout ♂ × *dilutata*, Schiff. ♀.
- dilutata*, Schiff. ♂ × *autumnata*, Bork. ♀, hybr. *robsoni*, Harrison (9).
- autumnata*, Bork. ♂ × *dilutata*, Schiff. ♀, hybr. *rungei*, Harrison (9).
- autumnata*, Bork. ♂ × *filigrammaria*, H.-S. ♀.
- filigrammaria*, H.S. ♂ × *autumnata*, Bork. ♀.
- (*dilutata*, Schiff. ♂ × *filigrammaria*, H.-S. ♀) died as larvae.
- Thera* (10) *variata*, Schiff. ♂ × *obeliscata*, Hb. ♀, hybr. *woodi*, Ckyne.
- obeliscata*, Hb. ♂ × *variata*, Schiff. ♀, hybr. *prouti*, Ckyne.
- Cabera pusaria*, L. ♂ × *exanthemata*, Scop. ♀, hybr. *fletcheri*, Tutt.
- exanthemata*, Scop. ♂ × *pusaria*, L. ♀.
- Ennomos autumnaria*, Wrbng. ♂ × *quercinaria*, Hufn. ♀, hybr. *dartfordi*, Tutt.
- Selenia bilunaria*, Esp. ♂ × *tetralunaria*, Hufn. ♀, hybr. *parvilunaria*, Bartel.
- tetralunaria*, Hufn. ♂ × *bilunaria*, Esp. ♀, hybr. *tetrabilunaria*, Klemann (11).
- Epione vespertaria*, F. ♂ × *repandaria*, Hufn. ♀, hybr. *isabellae*, Harrison (12).
- Pocillopsis*, *Lycia*, *Nyssia* (*Ithysia*) (13).
- P. lapponaria*, Bdv. ♂ × *N. (L.) zonaria*, Schiff. ♀, hybr. *smallmani*, Harrison.
- N. (L.) zonaria*, Schiff. ♂ × *P. lapponaria*, Bdv. ♀, hybr. *merana*, Burrows.
- N. (L.) zonaria*, Schiff. ♂ × *L. hirtaria*, Clrek. ♀, hybr. *harrisoni*, Harrison.
- L. hirtaria*, Clrek. ♂ × *N. (L.) zonaria*, Schiff. ♀, hybr. *denhami*, Harrison.
- P. lapponaria*, Bdv. ♂ × *L. hirtaria*, Clrek. ♀, hybr. *leesi* Harrison.
- L. hirtaria*, Clrek. ♂ × *P. lapponaria*, Bdv. ♀, hybr. *wallacei*, Harrison.
- Biston strataria*, Hufn. ♂ × *betularia*, L., ab. *carbonaria*, Jordan ♀, hybr. *herefordi*, Tutt.

Ectropis crepuscularia, Hb. ♂ × *bistortata*, Göze ♀, hybr. *bacoti*, Tutt.
bistortata, Göze ♂ × *crepuscularia*, Hb. ♀, hybr. *ridingi*, Tutt.

SECONDARY AND MORE COMPLEX HYBRIDS.

Zygæna loniceræ, Esp. ♂ × (*trifolii*, Esp. ♂ × *loniceræ*, Esp. ♀) ♀, hybr. *secunda*, Tutt.

(*loniceræ* ♂ × *trifolii* ♀) ♂ × (*trifolii* ♂ × *loniceræ* ♀) ♀, hybr. *complexa*, Tutt.

[(*loniceræ* ♂ × *trifolii* ♀) ♂ × (*trifolii* ♂ × *loniceræ* ♀) ♀] ♂ × *trifolii* ♀, hybr. *confusa*, Tutt.

loniceræ ♂ × [(*loniceræ* ♂ × *trifolii* ♀) ♂ × (*trifolii* ♂ × *loniceræ* ♀) ♀] ♀, hybr. *complicata*, Tutt.

[(*loniceræ* ♂ × *trifolii* ♀) ♂ × (*trifolii* ♂ × *loniceræ* ♀) ♀] ♂ × [(*loniceræ* ♂ × *trifolii* ♀) ♂ × (*trifolii* ♂ × *loniceræ* ♀) ♀] ♀.

Oporinia (14) (*dilutata* ♂ × *autumnata* ♀) ♂ × *autumnata* ♀.

(*dilutata* ♂ × *autumnata* ♀) ♂ × *dilutata* ♀.

(*autumnata* ♂ × *dilutata* ♀) ♂ × *autumnata* ♀.

(*autumnata* ♂ × *dilutata* ♀) ♂ × *dilutata* ♀.

dilutata ♂ × (*autumnata* ♂ × *dilutata* ♀) ♀, 46 male pupae, all of which died.

(*fligrammaria* ♂ × *autumnata* ♀) ♂ × *fligrammaria* ♀.

(*fligrammaria* ♂ × *autumnata* ♀) ♂ × *autumnata* ♀.

fligrammaria ♂ × (*fligrammaria* ♂ × *autumnata* ♀) ♀.

autumnata ♂ × (*fligrammaria* ♂ × *autumnata* ♀) ♀.

fligrammaria ♂ × [(*fligrammaria* ♂ × (*fligrammaria* ♂ × *autumnata* ♀) ♀)] ♀.

Poecilopsis, *Lycia*, *Ithysia* (15).

(*P. lapponaria* ♂ × *L. hirtaria* ♀) ♂ × *L. hirtaria* ♀, hybr. *maera*, Harrison.

(*L. hirtaria* ♂ × *P. lapponaria* ♀) ♂ × *L. hirtaria* ♀, hybr. *zetes*, Harrison.

(*N. zonaria* ♂ × *L. hirtaria* ♀) ♂ × *L. hirtaria* ♀, hybr. *goodwini*, Harrison. Died as larva.

Ectropis (*crepuscularia* ♂ × *bistortata* ♀) ♂ × (*bistortata* ♂ × *crepuscularia* ♀) ♀, hybr. *mixta*, Tutt (16).

crepuscularia ♂ × (*bistortata* ♂ × *crepuscularia* ♀) ♀, hybr. *reversa*, Tutt.

(CD ♂ × B ♀) ♂ × B ♀.

(B ♂ × CD ♀) ♂ × B ♀.

B ♂ × (B ♂ × CD ♀) ♀.

(B ♂ × CD ♀) ♂ × (CD ♂ × B ♀) ♀.

(CD ♂ × B ♀) ♂ × (CD ♂ × B ♀) ♀.

CD ♂ × [(B ♂ × CD ♀) ♂ × B ♀] ♀.

B ♂ × [(CD ♂ × B ♀) ♂ × B ♀] ♀.

[(CD ♂ × B ♀) ♂ × B ♀] ♂ × B ♀.

[(CD ♂ × B ♀) ♂ × (CD ♂ × B ♀) ♀] ♂ × B ♀.

(CD ♂ × B ♀) ♂ × [(CD ♂ × B ♀) ♂ × (B ♂ × CD ♀) ♀] ♀.

$B \text{ ♂} \times [(CD \text{ ♂} \times B \text{ ♀}) \text{ ♂} \times (CD \text{ ♂} \times B \text{ ♀}) \text{ ♀}] \text{ ♀}.$

$[(CD \text{ ♂} \times B \text{ ♀}) \text{ ♂} \times B \text{ ♀}] \text{ ♂} \times (CD \text{ ♂} \times B \text{ ♀}) \text{ ♀}.$

$(CD \text{ ♂} \times B \text{ ♀}) \text{ ♂} \times [(CD \text{ ♂} \times B \text{ ♀}) \text{ ♂} \times (B \text{ ♂} \times CD \text{ ♀}) \text{ ♀}] \text{ ♀}.$

$(B \text{ ♂} \times CD \text{ ♀}) \text{ ♂} \times [(CD \text{ ♂} \times B \text{ ♀}) \text{ ♂} \times (B \text{ ♂} \times CD \text{ ♀}) \text{ ♀}] \text{ ♀}.$

$C = Ectropis crepuscularia.$

$CD = E. crepuscularia \text{ ab. } delamerensis, B. \text{ White.}$

$B = E. bistortata.$

Other crosses were made between some of the more complicated of those given above.

HYBRIDS (ONE OR BOTH PARENTS NOT BRITISH).

Pieris rapae, L. ♂ \times *Pieris napi*, L. ♀, hybr. *narapae*, Müller (17).

Mimas and *Smerinthus*.

tiliae, L. ♂ \times *ocellatus*, L. ♀, hybr. *leoniae*, Stndfs.

Celerio, *Pergesa*.

euphorbiae, L. ♂ \times *gallii*, Rott. ♀, hybr. *kindervateri*, Kysela.

gallii, Rott. ♂ \times *euphorbiae*, L. ♀, hybr. *galiphorbiae*, Denso.

euphorbiae, L. ♂ \times *livornica*, Esp. ♀.

livornica, Esp. ♂ \times *euphorbiae*, L. ♀, hybr. *livorneuphorbiae*, Wolter.

gallii, Rott. ♂ \times *livornica*, Esp. ♀, hybr. *gallivornica*, Grosse and Kunz.

livornica, Esp. ♂ \times *gallii*, Rott. ♀.

elpenor, L. ♂ \times *euphorbiae*, L. ♀, hybr. *pernoldi*, Jacobs.

euphorbiae, L. ♂ \times *elpenor*, L. ♀, hybr. *harmuthi*, Kordesch.

porcellus, L. ♂ \times *euphorbiae*, L. ♀, hybr. *porcellophorbiae*, Muhr.

euphorbiae, L. ♂ \times *porcellus*, L. ♀, hybr. *euphorbiaella*, John.

elpenor, L. ♂ \times *gallii*, Rott. ♀, hybr. *elpogallii*, Castek.

gallii, Rott. ♂ \times *elpenor*, L. ♀, hybr. *gschwanderi*, Kordesch.

livornica, Esp. ♂ \times *elpenor*, L. ♀, hybr. *livopenor*, Müller (18).

gallii, Rott. ♂ \times *porcellus*, L. ♀, hybr. *eberharti*, Fischer.

elpenor, L. ♂ \times *porcellus*, L. ♀, hybr. *luciani*, Denso.

porcellus, L. ♂ \times *elpenor*, L. ♀, hybr. *standfussi*, Bartel.

Zygaena achilleae, Esp. ♂ \times *purpuralis*, Brünn. ♀, hybr. *locheri*, Vorbrodt. (19).

purpuralis, Brünn. ♂ \times *achilleae*, Esp. ♀, hybr. *purachilleae*, Vorbrodt. (19).

Spilarctia, *Diaphora* (20).

lubricipeda, L. (*menthastri*, Esp.) ♂ \times *mendica*, Clrck. ♀, hybr. *micheli*, Grosse.

Lasiocampa quercus, L. ♂ \times *trifolii*, Esp. ♀, hybr. *wagneri*, Tutt.

Notodonta ziczac, L. ♂ \times *tritophus*, Esp. ♀, hybr. *heinickei*, Hemmerling (21).

tritophus, Esp. ♂ \times *dromedarius*, L. ♀, hybr. *dubia*, Tutt.

Clostera curtula, L. ♂ \times *anachoreta*, Hb. ♀, hybr. *raeschkei*, Stndfs.

anachoreta, Hb. ♂ \times *curtula*, L. ♀, hybr. *difficilis*, Tutt.

pigra, Hufn. ♂ \times *anochoreta*, Hb. ♀, hybr. *pigranocheta*, Klemann. (22).

Monima stabilis, View. ♂ × *opima*, Hb. ♀ (23).

Ptychopoda herbariata, F. ♂ × *laevigata*, Scop. ♀ (24).

laevigata, Scop. ♂ × *herbariata*, F. ♀ (24).

eburnata, Wocke (*contigularia*, Hb.) ♂ × *seriata*, Schrank (*virgularia*, Hb.) ♀ (25).

seriata, Schrank ♂ × *eburnata*, Wocke ♀ (25).

seriata, Schrank ♂ × *herbariata*, F. ♀ (25).

SECONDARY HYBRIDS.

Sphingidae.

Smerinthus and *Laotohœ* (*Amorpha*).

(*ocellatus*, L. ♂ × *populi*, L. ♀) ♂ × *populi* ♀, hybr. *szczodrowskii*, Müller (26).

Celerio and *Pergesa*.

(*euphorbiae*, L. ♂ × *gallii*, Rott. ♀) ♂ × *euphorbiae*, L. ♀, hybr. *ebneri*, Grosse.

(*euphorbiae*, L. ♂ × *gallii*, Rott. ♀) ♂ × (*euphorbiae*, L. ♂ × *gallii*, Rott. ♀) ♀, hybr. *bikindervateri*, Grosse.

(*gallii*, Rott. ♂ × *euphorbiae*, L. ♀) ♂ × *gallii* Rott. ♀, hybr. *helenae*, Grosse.

(*euphorbiae*, L. ♂ × *gallii*, Rott. ♀) ♂ × *gallii*, Rott. ♀, hybr. *kindergallii*, Grosse.

euphorbiae, L. ♂ × (*euphorbiae*, L. ♂ × *gallii*, Rott. ♀) ♀, hybr. *tuchaci*, Vlach.

(*gallii*, Rott. ♂ × *euphorbiae*, L. ♀) ♂ × (*euphorbiae*, L. ♂ × *gallii*, Rott. ♀) ♀, hybr. *casteki*, Grosse.

(*elpenor*, L. ♂ × *porcellus*, L. ♀) ♂ × *euphorbiae*, L. ♀, hybr. *degenerata*, Kotzsch.

(*elpenor*, L. ♂ × *porcellus*, L. ♀) ♂ × *elpenor*, L. ♀, hybr. *elpenorides*, Kotzsch.

(*elpenor*, L. ♂ × *porcellus*, L. ♀) ♂ × *porcellus*, L. ♀, hybr. *stollei*, Zool. Inst., Vienna.

(*elpenor*, L. ♂ × *porcellus*, L. ♀) ♂ × (*elpenor*, L. ♂ × *porcellus*, L. ♀) ♀.

(*porcellus*, L. ♂ × *elpenor*, L. ♀) ♂ × *elpenor* ♀.

[(*gallii* ♂ × *euphorbiae* ♀) ♂ × *gallii* ♀] ♂ × *gallii* ♀, hybr. *pseudogallii*, Grosse.

[(*gallii* ♂ × *euphorbiae* ♀) ♂ × *gallii* ♀] ♂ × *euphorbiae* ♀, hybr. *zuerinai*, Grosse.

[(*gallii* ♂ × *euphorbiae* ♀) ♂ × *gallii* ♀] ♂ × [(*gallii* ♂ × *euphorbiae* ♀) ♂ × *gallii* ♀] ♀, hybr. *helenoides*, Grosse.

(*gallii* ♂ × *euphorbiae* ♀) ♂ × *euphorbiae* ♀, hybr. *grossei*, Denso.

(*gallii* ♂ × *euphorbiae* ♀) ♂ × (*euphorbiae* ♂ × [(*gallii* ♂ × *euphorbiae* ♀) ♂ × *euphorbiae* ♀] ♀) ♀, hybr. *pseudogrossei*, Günther.

(*euphorbiae* ♂ × *gallii* ♀) ♂ × *livornica* ♀.

(*gallii* ♂ × *euphorbiae* ♀) ♂ × *livornica* ♀ (27).

- euphorbiae* ♂ × [(*gallii* ♂ × *euphorbiae* ♀) ♂ × *euphorbiae* ♀] ♀,
hybr. *euphogrossei*, Günther.
- Olostera* (*curtula* ♂ × *anachoreta* ♀) ♂ × *anachoreta* ♀, hybr. *facilis*,
Tutt.
- (*anachoreta* ♂ × *curtula* ♀) ♂ × *curtula* ♀, hybr. *similis*, Tutt.
- (*curtula* ♂ × *anachoreta* ♀) ♂ × *curtula* ♀, hybr. *raeschkula*,
Federley (28).
- curtula* ♂ × (*pagra* ♂ × *curtula* ♀) ♀, hybr. *curtinervis*, Feder-
ley (28).
- (*pagra* ♂ × *curtula* ♀) ♂ × *curtula* ♀, hybr. *inversula*, Feder-
ley (28).
- (*curtula* ♂ × *pagra* ♀) ♂ × *curtula* ♀, hybr. *proavula*, Feder-
ley (28).
- [(*curtula* ♂ × *anachoreta* ♀) ♂ × *anachoreta* ♀] ♂ × *anachoreta*
♀, hybr. *approximata*, Tutt.
- curtula* ♂ × [(*anachoreta* ♂ × *curtula* ♀) ♂ × *curtula* ♀] ♀,
hybr. *curtuloides*, Stdfs. (29).
- Ectropis* (*bistortata* ♂ × *crepuscularia* ♀) ♂ × (*bistortata* ♂ × *crepus-*
cularia ♀) ♀ (30).

ADDENDA.

Hybrid *Phigalia pedaria*, Fb. ♂ × *Apocheima hispidaria*, Schiff. ♀. Mitford ("Proc. Ent. Soc. Lond.," 1861, March 4, p. 3) bred a female, *A. hispidaria*, and put a male, *pedaria*, into the cage with it. They copulated 5.iii.1859 and eggs were laid 7.iii. Eggs hatched the first week in April and the larvae pupated a month later. The following March three perfect and three crippled males and one female emerged, an accident having destroyed the greater part of the pupae. In size they were like *hispidaria*, but in colour lighter and with the green tint and transparency of *pedaria*. The legs and antennae of the female were annulated as in *pedaria*.

Hybrid *Nyssia zonaria*, ♂ × *Apocheima hispidaria*, ♀. Buckstone. "Proc. South Lond. Ent. and N.H. Soc.," 1914-15, 90. Three hundred fertile ova. Four imagines bred, 3 ♂, 1 ♀. Larvae resembled *hispidaria*.

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HYBRID LARVAE (Preserved), 3 forms.

Lycia hirtaria, Cl. ♂ \times *Pocillopsis lappouaria*, Bdv. Hybrids = *Lycia* Hybrid *wallacei*, Harrison.
Photos by W. H. T. Tams.



MALE AND FEMALE, Brood 'A' $\times 1\frac{1}{2}$

TWO BROODS OF THE HYBRID *LYCIA HIRTARIA*, Cl. ♂ × *POECILOPSIS LAPPONARIA*, Bdv. ♀ = *LYCIA* HYBRID WALLACEI, HARRISON.

(Plates V and VI.)

By C. N. HAWKINS, F.R.E.S.—Read 22nd June 1939.

In 1936 I received, through Mr Attwood, a few ova of *Poecilopsis lapponaria*, Bdv., which had been laid by a moth taken in the Blair Atholl district of Scotland. The larvae duly hatched, fed up and pupated, but no imagines emerged in 1937. In March 1938, however, two females appeared, at which time, as it fortunately happened, I was breeding a number of males of *Lycia hirtaria*, Cl., from eggs laid the previous year by a moth captured at Wimbledon, Surrey. Both the *lapponaria* females paired very readily with *hirtaria* males. Incidentally, it is curious to note that the latter showed no interest whatever in females, which I had also, of *Nyssia (Ithysia) zonaria*, Schiff., originating from the Isle of Coll, West coast of Scotland, though the cross between these two species is usually regarded as the easier one to obtain. I may mention also, though it has really nothing to do with the present subject, that again this year I have failed to get any pairings between local *hirtaria* and the *zonaria* of Isle of Coll origin. Neither sex of either species evinced any interest in the opposite sex of the other species even when the other sexes of their own species were in an adjoining cage.

Both the *lapponaria* females in due course laid good batches of fertile ova and I will call two subsequent broods Brood "A" and Brood "B." The ova were distributed as follows:—

					Brood "A"	Brood "B"
Mr R. W. Attwood	...	...	...	...	0	111
Dr E. A. Cockayne	...	...	...	...	36	53
Mr T. R. Eagles	...	...	...	...	27	0
Mr F. S. Stanley-Smith	...	...	...	...	32	0
Mr S. Wakely	...	...	...	...	37	0
Dr H. B. Williams	...	...	...	...	0	40
Retained for self	...	...	...	...	102	101
Totals					234	305

In the case of Brood "A" the parent female *lapponaria* emerged on 20th March and the parent male *hirtaria* emerged on 23rd or 24th March. Pairing took place on the evening of 24th March and they separated at about 1.30 p.m. on 25th March. Ova were laid from 25th March to 7th April and those eggs which I retained began to hatch on 6th May.

In Brood "B" the *lapponaria* parent emerged on 22nd March and the *hirtaria* parent had emerged on 20th March. These two paired at

about 7 p.m. on 22nd March, ova were laid from 26th March to 6th April, and those I kept for myself began to hatch on 8th May. My larvae were fed on Hawthorn, underwent four changes of skin (not counting the change to pupa) at intervals of from nine to ten days. One larva of Brood "B" was teratological, having the right half of the 3rd abdominal segment missing. This abnormality was continued in the pupa but unfortunately the imago failed to emerge. Like the teratological imago of Brood "A" mentioned later, I hope Dr Cockayne will be able to include a description of this in a paper elsewhere later on. Brood "A" began to go underground for pupation on 20th June and Brood "B" followed suit the next day. The last one of Brood "B" went down on 12th July, but owing to an oversight no record appears to have been kept of the last date for Brood "A."

A certain (small) number of my ova failed to hatch, three larvae were preserved and some larvae died at various stages during breeding. Eventually, 75 of my larvae of Brood "A" and 58 of Brood "B" went down but of these several failed to effect the change to pupa so that actually I obtained 60 pupae only of Brood "A" and 45 of Brood "B." My pupae of Brood "A" were kept indoors in a cool room while those of Brood "B" were kept in a shed in the garden. The imagines of Brood "A" began to emerge on 11th February 1939, when a female appeared, and this sex continued till 2nd April; males began to come out on 26th February and continued till 5th April. In all, my 60 pupae of this brood produced 26 males and 23 females, 4 males and 6 females died fully developed in the pupa, and 1 male pupa is still (22nd June) 1939) alive, apparently undeveloped, and may be going over another winter.¹ Three males and four females failed to expand their wings properly and one female of this brood is teratological, having reduplication of part of the right metathoracic leg. I hope Dr Cockayne will be able to describe this last mentioned specimen in due course elsewhere as this is not a suitable place to deal with an abnormality of that kind.

Brood "B" females commenced to emerge on 27th February 1939 and continued to appear till 8th April, while the males emerged over the period from 24th March to 14th April. My 45 pupae of Brood "B" did not yield quite so well as the "A" ones and gave 14 males and 12 females only, 5 males and 12 females died as pupae and two male pupae are still alive and apparently quite undeveloped.² Two females and one male of this brood failed to expand properly. As will be seen from the accompanying exhibit which shows a selection of my specimens from the two broods, there is considerable variation in both males and females. The latter seem to vary chiefly in the shape of their wings, long, narrow and pointed, or broader and more rounded, while several are asymmetrical. Males, on the other hand, differ principally in colour, having, at one end of the range, a pale ochreous-grey ground with strongly contrasting blackish cross lines, and at the other extreme being almost uniformly blackish with a pale ante-marginal line and hardly noticeable cross lines. Brood "B" seems slightly more variable in the males than



Males. Females.
 Brood "A." Brood "B."
Lycia hirtaria, Cl. ♂ × *Poecilopsis lapponaria*, Bdv. *Hybrids = Lycia hybrid wallacei*, Harrison.
 Photos by W. W. H. T. Tams.

Brood "A." Photographs of a portion of the selection of specimens from both broods contained in the exhibit are reproduced on Plate VI, and of a pair ($\times 1\frac{1}{2}$ diameters) from Brood "A" on Plate V. The results, so far as I have been able to ascertain them, obtained by the others who shared the ova were as follows:—

BROOD "A."

	Pupae.		Imagines bred.	
	♂	♀	♂	♀
Dr Cockayne	14	11 (+4 dead, sex unknown)	8	7
Mr Eagles	7	6	2	2
Mr Stanley-Smith (All died before pupation)	—	—	—	—
Mr Wakely	7	9 (+6 dead, sex unknown)	7	9
	28	26 (+10 dead, sex unknown)	17	18
Adding my own results:—	30	30	26 (+1 live pupa) ³	23
Gives totals:— (So far as known)	58	56 (+10 unknown sex)	43 (+1 live pupa)	41

BROOD "B."

	Pupae.		Imagines bred.	
	♂	♀	♂	♀
Mr Attwood (All accidentally lost or died but 2)	2	0	0	0
Dr Cockayne	(?)10	(?)0	10	0
Dr Williams	9	13 (+2 dead, sex unknown)	9	13
	(?)21	(?)13 (+2 dead, sex unknown)	19	13
Adding my own results:—	21	24	14 (+2 live pupae) ⁴	12
Gives totals:— (So far as known)	(?)42	(?)37 (+2, ? sex)	33 (+2 live pupae)	25

The larvae and the pupae are intermediate between those of the two parent species, but, as will be seen from the photograph of three selected examples reproduced on Plate V, the former vary considerably in colour and markings, especially in the size, shape and colour of the yellow spots. These may be transversely linear and conspicuous, or small and nearly circular. In colour they may be pale lemon-yellow and contrasting strongly with the ground colour, or deep orange or brownish and very inconspicuous.

Several pairings between male and female hybrids were obtained and in one case three or four moderately well formed ova were laid but they were laid loose and shrivelled almost at once without showing any trace of development. I myself failed to obtain any pairing between a male hybrid and a female *hirtaria* in spite of several attempts, but both Dr Williams and Mr Wakely succeeded and good batches of ova were laid

of which I received a good number. All those I had, however, failed to hatch, though some from each source changed colour somewhat.

In conclusion, I wish to express my sincere thanks to Mr W. H. T. Tams of the British Museum (Nat. Hist.) for all the time and trouble he has so kindly spent in taking the necessary photographs.

¹This pupa survived the severe winter of 1939-40 and produced a nearly perfect ♂, 23.iii.40. The legs were ill developed on the R. side.—C. N. H.

²These pupae yielded perfect imagines, 21.iii.40 and 31.iii.40 respectively.—C. N. H.

³Produced an imago, 23.iii.40.—C. N. H.

⁴Produced imagines, 21.iii.40 and 31.iii.40 respectively.—C. N. H.

PARASITES OF GALL-CAUSING INSECTS.

By M. NIBLETT.—Read 13th July 1939.

The larvae of gall-causing insects are frequently the hosts of parasitic larvae belonging to the Hymenopterous families *Ichneumonidae*, *Braconidae*, *Chalcididae*, and *Proctotrupidae*.

There are many other enemies of the larvae of gall-causers but upon these I do not propose to touch, confining my remarks to the true parasites as we understand the term.

It is not at all an easy matter to decide whether a parasitic insect emerging from a gall had the gall-causing larva as its host. I am of the opinion that many of the records of parasites of gall-causing insects are, to say the least, doubtful; this refers particularly to the larger Cynipid galls, in which there may be the larvae of the gall-wasps, inquiline Cynipids and of commensals. For instance, from the "oak-apple gall" caused by *Biorrhiza pallida*, Oliv., we have recorded Lepidoptera, 15; Coleoptera, 1; Synergi, 3; Cecidomyiids, 1; Ichneumons, 8; Braconids, 9; and Chalcids, 15 species. Also the majority of these records date from between 1842 and 1882, so with all due respect to those who were responsible for them I feel that many may require verifying, and that a great deal of very careful breeding of the parasites is necessary to decide definitely what were their hosts.

Again, with the Trypetid galls in flower-heads of Compositae, the portion not occupied by the gall may contain the larvae of other *Trypetidae*, *Cecidomyiidae*, Lepidoptera, etc. Where the gall is a more or less solid mass one can remove all other material and so ensure that whatever emerges does definitely come from the gall; but where it consists of a swollen flower-head of loose consistency there may be interlopers.

It is rather interesting to note the preservative effect upon the galls which the presence of living larvae or pupae in them has. This is, of course, particularly noticeable when the galls are of a soft and succulent nature and consequently likely to decay readily. Galls of the Cynipid *Neuroterus baccarum*, L., after the insect has emerged rapidly shrivel up or decay, but those containing parasitized larvae persist sometimes for many months, retaining their form if not their early freshness. I have found galls of the Sawfly *Pontania viminalis*, L., upon the leaves of *Salix purpurea*, L., in mid-winter, looking as fresh as they did when they had reached maturity in the previous summer, and found that they contained the larva or pupa of a Chalcid which had disposed of the rightful tenant. Another interesting point is the effect certain parasites have upon their host larvae, in which they induce premature pupation.

With the Trypetid fly *Euribia jaceana*, Hér. (recorded as *Urophora solstitialis*, L.) the larva normally pupates in May, but when attacked by the larva of the Chalcid *Eurytoma curta*, Wlk., which is an ecto-parasite, premature pupation takes place, the puparium being formed before the end of the preceding year.

The Chloropid fly *Lipara luccens*, Mg., which causes the cigar-shaped galls upon the stems of the Reed *Phragmites communis*, Trin., has its larva attacked by a Braconid *Polemon liparae*, Gir. The fly larva, which is full grown in the autumn, normally hibernates in its final larval instar and pupates in May, but when attacked by the parasite, pupation takes place some six months before its normal time.

The insects causing galls are to be found in the following Orders:—Lepidoptera, Coleoptera, Hymenoptera, Diptera, and Rhynchota.

Of the parasites of gall-causing Lepidoptera I have no personal experience, nor do I know of any records of such.*

Coleopterous gall-causing larvae are attacked by both Braconids and Chalcids. I have bred Braconids from galls of *Gymnetron antirrhini*, Pk., on *Linaria vulgaris*, L. (Toadflax), and from those of *Miarus campanulae*, L., on *Campanula rotundifolia*, L. (Hairbell), these emerging in May. Chalcids emerged also in September. A few Chalcids emerged with *Apion loti*, Kir., in September from galled seed-pods of *Lotus corniculatus*, L. (Bird's-foot Trefoil), while Braconids emerged in August.

Many parasites may be bred from galls caused by one or other of the Hymenopterous families giving rise to them.

Larvae of Saw-flies (*Tenthredinidae*) are parasitized by Chalcids and Ichneumons. I have bred very few of the former, but Ichneumons have emerged in May, September, and November from *Pontania proxima*, Lep., the species causing the "Horse-bean Gall" so familiar upon the leaves of various species of *Salix*. I have also bred them from galls of *P. viminalis*, L., in May.

Gall-causing *Cynipidae* are mainly parasitized by Chalcids, but in the genus *Rhodites*, whose galls are confined to Roses, Ichneumons are not uncommon parasites, *Orthopelma luteolator*, Grav., being commonly bred from *Rhodites rosae*, L., "Robin's pin-cushion gall," and also from *R. nervosus*, Curt., and *R. eglanteriae*, Htg., the "pea-galls." I have bred no Braconids from Cynipid galls and think it probable that many of those recorded from these galls were parasites of the larvae of other insects which had found asylum in the galls. The same applies to Proctotrupids; there are several species of Cecidomyiids living in Cynipid galls asinquilines, and it is in all probability that these larvae were the hosts of the Proctotrupids.

*Some are recorded in a paper, "The Hymenopterous Parasites of the British Lepidoptera," by C. Morley and W. Rait-Smith, "Trans. R. Ent. Socy.," lxxi, 133 and seq., e.g., *Synanthedon flaviventris*, Stdgr., galls by *Macrocentrus marginator*, Nees, and *Ephialtes strobilorum*, Ratz.—C. N. H.

As regards the Chalcid parasites, those in the galls found on oak trees may have had either the gall-wasp larvae or those of inquilines as hosts, but with Cynipid galls on plants other than the oak the gall-wasp larvae are undoubtedly the hosts. It is astonishing the number of Chalcids one may breed from these last-mentioned galls and they undoubtedly at times destroy colonies of these Cynipids. I have observed several instances where a local colony has disappeared owing to the heavy attacks of Chalcids; again I have been surprised to find other colonies persist, although the galls I took from them yielded a very high percentage of these parasites.

Of the Dipterous galls other than those caused by *Cecidomyiidae* and *Trypetidae* I have had little experience, but have bred Braconids from those caused by *Melanagromyza schineri*, Gir., and Chalcids from those of *Lipara lucens*, Mg., and *Chlorops taeniopus*, Mg.

Trypetid larvae are subject to the attacks of Braconids, Chalcids, and sometimes, I believe, Ichneumons.

I have bred *Microbracon variator*, Nees., from galls of *Sphenella marginata*, Fall., and from those of *Noeëta pupillata*, Fall. Both these galls are of a loose texture and I had not bred any Braconids from Trypetid galls of hard and woody substance until this year (1939), when some emerged from galls of *Euribia cuspidata*, Mg. Ichneumons have emerged from material containing Trypetid galls, but I should not care to state definitely that the Trypetid larvae were their hosts.

The Chalcids attacking Trypetid larvae are to be found chiefly among the families *Torymidae*, *Eurytomidae*, and *Pteromalidae*. Some Trypetid larvae are the hosts of several species of Chalcids which may be ecto- or endo-parasites. I have bred Chalcids in considerable numbers from galls of *Euribia stylata*, Fab., *E. jaceana*, Her., *E. carbu*, L., *E. cuspidata*, Mg., *Myopites blotii*, Breh., *Sphenella marginata*, Fall., and *Noeëta pupillata*, Fall.

The larvae of gall-causing *Cecidomyiidae* are attacked by Chalcids and Proctotrupids; many of the latter are egg parasites. The ova of the *Platygasteridae* are laid in the eggs of their host, but their development is not arrested as the larval parasite does not develop until after the Cecid larva has left its egg.

I have bred very few Proctotrupids; from Cecidomyiid galls of *Rhabdophaga rosaria*, H. Loew, *Perrisia ulmariae*, Brem., and *Contarinia tragopogonis*, Kief., I have had these insects emerge in May and June, and have also bred a few from Cecid larvae living in flower-heads but not causing galls.

Chalcids bulk very largely as parasites of gall-causing Cecidomyiids; I have bred large numbers from the galls of many species. In some cases I have failed to rear the midge owing to their larvae being so heavily parasitized, while in other cases I have obtained, in addition to a considerable number of Chalcids, a very good percentage of the gall-midge.

Gall-causing Rhynchota are undoubtedly parasitized by both Braconids and Chalcids, and possibly by parasitic *Cynipidae*; of the parasites of this group I can say but little from personal experience. I have bred a few Chalcids from galls by several species of *Psyllidae* and also a few from those caused by species of *Aphididae*.

I have made no reference to hyperparasites, but some of the Chalcids may be hyperparasites of other Chalcids or of Braconids; or again some of the Braconids bred may be hyperparasites of some of the Chalcids.

Comparison of the times of emergence of the parasite with the possibility of the host larvae being available for attack may be of some interest. Ichneumons and Braconids emerging in the autumn undoubtedly hibernate, at least the females do, and probably Chalcids do the same, but the question of alternate hosts arises. The first two are known to attack a variety of other insect larvae, as also do many species of Chalcids, but I believe many of the latter confine their attacks to one host.

Microbracon variator I have bred from galls of the Trypetid *Sphenella marginata* in August and September and again in May and June; *S. marginata* emerges in the autumn and hibernates, but its galls are not usually in evidence until the end of July. This would suit the Braconids emerging in May and June, but I feel doubtful about those which emerged in the previous August and September surviving to use the *Sphenella* larvae as hosts.

The Ichneumon *Orthopelma luteolator* is, I believe, confined to the Cynipid genus *Rhodites*, and as these insects emerge in May and June and the *Rhodites* at about the same time, the host larvae are undoubtedly ready in good time for the attentions of the parasite.

Many Chalcids emerge from Trypetid galls about the same time as the gall-fly, as also do many from Cynipid galls on plants other than the oak, but many emerge in August and September of the year before that in which fresh galls will appear. Chalcids emerging from oak-galls of species having an alternate generation further complicate matters. Many of these emerge in March, April, and May, while others emerge in August and September. Chalcids from *Biorrhiza pallida*, Oliv., emerge in March, April, May, and June of the second year, in time to parasitize larvae in galls of that year; I have observed Chalcids ovipositing in fresh galls in May.

Chalcids I have had emerge from galls of *B. aptera*, Bosc., the alternate generation of the last species, in August of the second year, but are a species which definitely does not effect *pallida*.

Again Chalcids from galls of *Trigonaspis megaptera*, Panz., emerging in July, are a species which does not attack the autumn gall *T. renum*, Gir.

Larvae of *Neuroterus albipes*, Schk., are usually heavily parasitized, the Chalcids emerging as a rule in June and July; there are, of course, no more galls of *albipes* until the following spring, but whether the same

species of Chalcid attacks the alternate generation, *N. laeviusculus*, Schk., in the autumn I am unable to say.

There is a possibility that some, at least, of the parasites affecting gall-causing insects may be of considerable economic importance, and an amateur like myself might be able to provide some useful data if he were able to get the insects he bred named within a reasonable time, which unfortunately seems quite out of the question in this country.

You will realize from the brief outline of the subject that I have just given that there are unlimited opportunities for research work in connection with the parasites of gall-causing insects.

NOTES ON BREEDING AND SETTING MICRO-LEPIDOPTERA.

By L. T. FORD—Read 27th July 1939.

I have often asked my entomological friends who confine their attention to the Macro-lepidoptera why they do not take up the study of the "micros"—a group of insects which are especially interesting on account of their great variety of structure and habit. The usual reply has been that the micros, owing to their small size, are too difficult to set and difficult to identify. These difficulties are more imaginary than real, especially if the beginner will be content for the first year or so to obtain his material in the larval stage. Specimens taken on the wing in hot dry weather are perhaps a little difficult to set, as the body juices are partially dried, but bred specimens are perfectly flexible and with a little practice can be set with ease. Identification, too, presents little difficulty when one has specimens in good condition and a knowledge of the food plant and time of appearance of the larva.

I would strongly recommend anyone commencing the study of the micro-lepidoptera to obtain his material in the larval stage. In addition to the advantages referred to above, the following may be mentioned:—

- (a) By breeding one obtains a more intimate knowledge of the habits of each species.
- (b) Many species are more easily obtained in the larval stage, e.g., *Mompha propinquella*, Staint. I have seen only an odd specimen or two of this species in a locality when larvae can be found in great abundance.
- (c) The larvae of many species can be obtained feeding in seed-heads, stems, and roots of various plants during the winter months when one's spare time is not occupied with setting captures. It is not always practicable to devote the time necessary to set a good day's captures on the wing, but time can usually be found for setting the few insects emerging each day in the breeding cages.

I use three types of breeding cage, each of simple construction:—

- (1) A glass tongue jar. The rim of the jar should be ground down by rubbing on a flat stone on which has been sprinkled some fine silversand and water—a process occupying a few minutes. A jar thus treated and covered with a piece of plate glass (not ordinary window glass) is perfectly larva-tight for the smallest larvae. This type is particularly suitable for larvae feeding on leaves which wither quickly or are rather dry. With a supply of jars the transference of larvae to fresh food in a

clean jar takes very little time. Care should be taken not to overcrowd a jar with too much food or too many larvae, otherwise "sweating" will occur.

- (2) An ordinary flower-pot with the rim ground flat. This should be half-filled with sand or fine earth and covered with plate glass or muslin. This type is suitable for larvae feeding on very succulent leaves which would sweat in a glass jar.
- (3) A cylinder made out of transparent sheet-celluloid. The cylinders can be made to fit a round tin or jar or can be sunk into sand in a flower-pot or into soil so as to enclose the growing food plant.

Suitable material for pupation should be put into the breeding cages before the larvae are full fed or the full-fed larvae can be transferred to another cage containing the material. Larvae which feed in the spring and produce imagines in the autumn usually require earth for pupation and will die without it. In general, larvae producing imagines in the same year will pupate amongst any dry rubbish. Some larvae require hollow stems for pupation and it is a good plan to include a few when doubtful what is the proper material. I once bred some *Cosmopteryx eximia*, Haw., but could not get the larvae to spin up for pupation until I introduced some bits of old hop-bine into the breeding cage.

Winter pupae are best kept in tins in a cellar or cold outhouse. Larvae which pass the winter in a puparium should be induced to spin up in hollow stems (e.g. *Heracleum*, etc.). The stems should be placed in a large flower-pot half-filled with sand, with a layer of pebbles on the surface. The flower-pot should be kept out of doors under cover and the sand kept moist without wetting the stems. This treatment is the most suitable, in my experience, for Lithocolletids and in fact all species which pass the winter as full-fed larvae. The damp sand provides sufficient moisture and the layer of pebbles keeps the material in which the larvae have spun up from becoming waterlogged. Too much moisture or absence of moisture seems equally fatal to all hibernating larvae.

For good setting it is essential that the insects should be perfectly relaxed. The laurel-leaf relaxing tin is not suitable, in my opinion, for micros as the cilia of insects kept therein rapidly become matted. I prefer the ordinary cork-lined zinc box, one side of which should be wetted and the insects pinned on the dry side. Twelve to twenty-four hours should be sufficient to relax insects killed with cyanide; an hour or so for those killed with 0.880 ammonia.

When pinning I empty the killing bottle on to a small square of white blotting paper (which can be turned round as required), pierce the chitin of the thorax with the pin and finish pinning on a block of polyporus without handling the insect. Only rustless metal pins should be used. For Lithocolletids and smaller insects I use size 0.0056, length 7 mm. A short pin is less apt to bend and it is unnecessary to set an

insect high on a pin if it is later mounted on polyporus as all micros should be. I find that magnetised forceps are very convenient for picking up rustless metal pins.

Setting boards suitable for micros often present a problem as boards supplied by dealers, unless specially made to order, usually have the grooves far too wide and too deep. I find that the simplest plan is to make the boards, or rather the grooves, myself. For the smallest moths, e.g. a *Nepticula*, I make the groove by nicking out a triangular section of the cork with a safety razor blade. The board should be prepared before cutting the groove and fine pencil lines ruled the appropriate distance apart can act as guides for the razor blade. A wider groove is easily made with a fine tenon or dove-tailed saw, the groove being finished with glass paper (No. 0), and the board afterwards papered.

NOTES ON A WEEK IN SHROPSHIRE AND NORTH WALES.

By G. V. BULL, B.A., M.B.

Dr G. V. Bull communicated the following "Notes on a Week in Shropshire and North Wales," in amplification of his remarks at a meeting.

I spent a very pleasant week with Mr W. T. Mellows collecting in the Midlands and N. Wales at the end of June. The chief objects of the trip were *Coenonympha tullia* (tiphon) and *Plebeius argus* (aegon). We motored to Shropshire on June 26th, spending the first night at Cressage, close to the Wrekin. In the evening we sugared in a wood near by but only common species, such as *Naenia* (*Mania*) *typica*, L., *Xylophasia rurea*, Fb., *Agrotis exclamatoris*, L., *Oligia* (*Miana*) *strigilis*, Clrck., *O. (M.) fasciuncula*, Haw., and a few Geometers were taken. Later we turned on our car lights in a ride in another wood but without much success, as the moon was near the full. The chief species that appeared was *Boarmia repandata*, L. Next morning we went on to Whixall Moss, but *C. tullia* was only just appearing, and no females were seen. A number of *Ematurga atomaria*, L., were on the wing and a varied series were taken. A fresh *Acronicta menyanthides*, View., was secured on the heather, but she deposited no ova and no males appeared the next night when she was left out of doors while we were sugaring. In the afternoon we motored on to the Bala locality, but the wind was high and the sun was hidden for the greater part of the time and no *C. tullia* were seen after a prolonged search, so we motored on to Conway hoping to try for *Agrotis ashworthii* on the Sychnant Pass, but there the rain came down after dinner and we attended the local cinema instead. Next morning we motored around the Great Orme's Head, but conditions were again unfavourable and no *P. argus* were seen. As it was still cloudy and windy we went straight back to Whixall without paying a second visit to the Bala locality. We had both seen new country which, to some extent, made up for our collecting disappointment. In the evening we sugared on the Moss and took *X. rurea*, form *alopecurus*, Esp., in some number, and also *Xylophasia hepatica*, L., *Mamestra pisi*, L., and *Oligia* (*Miana*) *bicoloria*, Vill. To light there came *Hypena proboscidalis*, L., *Plusia chrysitis*, L., and *P. iota*, L. *Diacrisia* (*Spilosoma*) *lubricipeda*, L. (*menthastri*, Esp.) and *Dipterygia scabriuscula*, L. The next day we visited the Moss both morning and afternoon and succeeded in netting about 16 *C. tullia*, but still no females were on the wing. *E. atomaria* was again plentiful and a small form of *Perconia* (*Aspitates*) *strigillaria*, Hb., were taken. In the late evening

we motored back to Peterborough. The next morning I visited one of the localities for *Thecla pruni*, L., without success. In the afternoon we went to Warboys Wood, but the weather was still unfavourable and still no *T. pruni*. Many *O. (M.) bicolorata* were beaten from the hedges with *H. proboscidalis*, *Euphyia bilineata*, L., and *Cabera pusaria*, L. On my way home I took my first *Earias chlorana*, L., which was just emerging on some willows near Whittlesea. In the evening we sugared near Wansford and noted 38 different species, including *Mamestra configua*, Vill., *Tapinostola extrema*, Hb., *Aplecta advena*, Fb., and *Mamestra thalassina*, Rott. Thus ended an enjoyable though somewhat disappointing trip.

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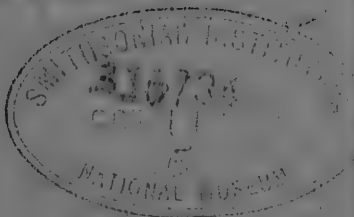
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1941

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THE CHAPTER HOUSE, ST THOMAS' STREET, SOUTHWARK, S.E.1.

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 1931 ATTWOOD, R. W., *Council*, 36, Tannsfield Road, Sydenham, London, S.E.26. *l, c*.
 1936 AUGUST, V. E., 59, Hillcross Avenue, Morden, Surrey. *ent*.
 1939 BAKER, D. B., 21, Quarry Park Road, Cheam, Surrey. *l, c*.
 1937 BALLINGER, D. E., "The Cottage," Canham Road, Acton, London, W.3. *l, A.F.*
 1896 BARNETT, T. L., 31, Littleheath Road, Selsdon, Surrey. *l*.
 1887 BARREN, H. E., 78, Lyndhurst Road, Peckham, London, S.E.15. *l*.
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 1929 BELL, J. H., Dudswell Rise, Northchurch, Berkhamstead, Herts.
 1911 BLAIR, K. G., D.SC., F.R.E.S., 38, The Pryors, East Heath Road, Hampstead, London, N.W.3. *n, c*.
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 1925 BLYTH, S. F. P., "Cleveland," Chislehurst, Kent. *l*

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Herne Bay, Kent. *l. A.F.*
- 1935 BOWLES, T. J.
- 1933 BRETT, G. A., B.Sc., A.R.C.S., D.I.C., Seale-Hayne Agricultural
College, Newton Abbot, S. Devon. *ent.*
- 1935 BRETT, Mrs KATHLEEN S. L. F., 2, Old Claygate Lane, Hinchley
Wood, Esher, Surrey. *biology.*
- 1940 BRITTEN, H., "Newholme," 21, Toller's Lane, Old Coulsdon,
Surrey. *ent (chalcididae).*
- 1930 BROOKE, Miss W. M. A., c/o Dr Brooke, 99, The Avenue, Muswell
Hill, London, N.10. *ec. ent, b, marine life.*
- 1939 BROWN, A. G., L.D.S., R.C.S.ENG., 17, The Vale, Golders Green,
London, N.W.11. *l. A.F.*
- 1938 BROWN, S. HAMILTON, L.D.S., R.C.S.ENG., Flat 2, 67, Suddler
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Golders Green Road, London, N.W.11. *l.*
- 1938 BURTON, Miss MARGARET, "Newlands," 212, Golders Green Road,
London, N.W.11. *biology.*
- 1922 BUSHBY, L. C., F.R.E.S., 33c, Regent's Park Road, London, N.W.1.
c, hem.
- 1937 CARDEW, Col. P. A., 21a, Thornton Hill, Wimbledon, London,
S.W.19. *l. A.F.*
- 1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs.
l, n.
- 1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate, Sur-
rey.
- 1936 CHARTRES, S. A., F.R.E.S., 9, King's Drive, Eastbourne, Sussex.
ent.
- 1922 CHEESEMAN, C. J., 100, Dallinger Road, London, S.E.12. *l.*
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- 1907 COOTE, F. D., F.R.E.S., *President*, 32, Wickham Avenue, Cheam, Surrey. *l, b*.
- 1923 CORK, C. H., 11, Redesdale Street, Chelsea, London, S.W.3. *l*.
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- 1928 COURT, T. H., "Oakleigh," Market Rasen, Lincoln.
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- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l, c*.
- 1937 DEAL, JAMES, 18, Manor Road, West Wickham, Kent. *l*.
- 1933 DEMUTH, R. P., Manor Farm, Compton Greenfield, near Bristol, Gloster. *l*.
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, London, S.W.1. *l, mi, b, nat. phot.*
- 1930 DENVIL, H. G., *Hon. Secretary*, 4, Warwick Road, Coulsdon, Surrey. *l, c*.
- 1901 DODS, A. W., 35, The Mall, Southgate, London, N.14. *l*.
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading, Berks. *l*.
- 1939 DOUBLEDAY, B. S., F.R.E.S., Monk's Risborough, Aylesbury, Bucks. *chalcidoidea*.

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- 1937 EASTON, N. T., 214, Worcester Road, Droitwich Spa, Worcestershire. *l*.
- 1933 ELGOOD, W. S., North Brink, Wisbech, Cambs. *l*.
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- 1937 EMBRY, B., F.R.E.S., 23, Mill Drove, Uckfield, Sussex. *l. A.F.*
- 1932 ENNIS, L. H., c/o "Bandora," Portmore Park Road, Weybridge, Surrey. *l. A.F.*
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- 1930 FERLIER, W. J., F.R.E.S., 86, Portnalls Road, Coulsdon, Surrey. *l. A.F.*
- 1936 FINNIGAN, W. J., *Council*, 87, Wickham Avenue, Cheam, Surrey. *ent, nat. phot*.
- 1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c*.
- 1920 FORD, L. T., 25 Elms Road, Bare, Morecambe, Lancs. *l*.
- 1939 FORSTER, H. W., 76, Station Road, Chingford, London, E.4. *c*.
- 1915 FOSTER, T. B., "Downlands," 24, York Road, Selsdon, Surrey. *l*.
- 1933 FRASER, ANGUS, "Ranelagh," Gloucester Rd., Tankerton, Kent. *c*.
- 1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., "Heavers," Ryarsh, Kent. *l*.
- 1912 FROHAWK, F. W., M.B.O.U., Borgan Cottage, Borgrenman, Newton Stewart, Galloway, N.B. *l, orn*.
- 1930 GILLIAT, F. T., B.A., F.R.E.S., Two Brewers Inn, Chipperfield Herts. *l*.
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l*.
- 1936 GOODBAN, B. S., "The Nines," Village Way, Little Chalfont, Bucks. *l*.
- 1936 GOODE, FRANK, 275, Eastern Avenue, Ilford, Essex. *l*.
- 1935 GOODLIFFE, F. D., Lord Wandsworth Agricultural College, Long Sutton, Basingstoke. *ec, ent*.

YEAR OF
ELECTION.

- 1926 GORDON, D. J., B.A., F.R.E.S., "Craigellachie House," Strathpeffer, Ross. *c, l.*
- 1936 GOWING-SCOPES, E., Oakhurst, Oakwood Road, Crofton, Orpington, Kent. *l.*
- 1924 GRANT, F. T., 37, Old Road West, Gravesend, Kent. *l, c.*
- 1924 GREER, T., J.P., "The Bungalow," Sandholes, Dungannon, Co. Tyrone. *l.*
- 1926 GREY, MRS OLIVE, F.Z.S., 66, Barrington Court, Pages' Hill, London, N.10. *ent.*
- 1933 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe, Croydon, Surrey. *b.*
- 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfield Road, Oxford. *l.*
- 1903 HARE, E. J., F.R.E.S., Harrow Place, Pinden, Dartford, Kent. *l.*
- 1926 HARMSWORTH, Sir HILDEBRAND A. B., F.R.E.S., 19, Princes Gate Court, London, S.W.7.
- 1937 HARRIS, H. G., M.D., B.S. (DURHAM), 5, Archer's Road, Southampton, Hants. *l.*
- 1936 HARRIS, W. H. A., 48, Corringway, London, W.5. *l.*
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road, Winton, Bournemouth, Hants. *l.*
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, London, S.W.2. *l.*
- 1924 HAWKINS, C. N., F.R.E.S., *Council*, 23, Wilton Crescent, Wimbledon, London, S.W.19. *l.*
- 1929 HAWLEY, Lt.-Col. W. G. B., D.S.O., "Amber Cottage," Bodenheim, near Salisbury, Wilts.
- 1938 HAYNES, R. F., "The Sanctuary," Burney Road, West Humble, Dorking, Surrey. *l. A.F.*
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental Agricola, Casilla Correo 71, Tucuman, Argentina. *l, orn, c.*
- 1937 HAYWARD, L. W., "Westoe," 31, Bower Mount Road, Maidstone, Kent. *ent.*
- 1936 HEDGES, A. V., F.R.E.S., Ballovale, Santon, Isle of Man. *l.*
- 1920 HEMMING, Capt. A. F., C.M.G., C.B.E., F.Z.S., F.R.E.S., 18, Glebe Place, Chelsea, London, S.W.3. *l.*
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c. A.F.*
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., c/o Messrs Griffiths and McAlister, 10, Warwick Street, Regent Street, London, W.1. *l.*
- 1927 HEWER, H. R., M.Sc., D.I.C., Royal College of Science, S. Kensington, London, S.W.7.
- 1937 HICK, E. PENTLAND, F.R.E.S., Athol House, Scarborough, Yorks. *l. A.F.*
- 1927 HOWARD, P./O. J. O. T., R.A.F.V.R., c/o Barclays Bank Ltd., 161, New Bond Street, London, W.1. *l. A.F.*

YEAR OF
ELECTION.

- 1931 HOWARTH, T. G., F.R.E.S., 77, Woodland Rise, Muswell Hill, London, N.10. *l*, *A.F.*
- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea, Essex. *l*, *ent*.
- 1929 HUGHES, ARNOLD W., Lower Farm, Quainton, Bucks. *l*.
- 1939 HULLS, L. G., F.C.S., F.R.M.S., F.R.E.S., "Rax," Chidham, near Chichester, Sussex. *ent*.
- 1938 HUMPHREYS, J. A., The Orchard, 105a, Swinburne Road, Abingdon, Berks. *l*.
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l*.
- 1928 JACKSON, F. W. J., "The Pines," Ashted, Surrey.
- 1940 JACKSON, Capt. REGINALD A., R.N., "The Hermitage," Bishops Waltham, Hants, and The Junior United Service Club, London, S.W.1. *ent*, *l*. *A.F.*
- 1923 JACOBS, S. N. A., *Council*, "Ditchling," 54, Hayes Lane, Bromley, Kent. *l*, *e l*.
- 1924 JAMES, A. R., 147a, Aldersgate Street, London, E.C.1. *l*.
- 1924 JAMES, RUSSELL, F.R.E.S., 147a, Aldersgate Street, London, E.C.1. *l*.
- 1936 JAMES, L/Bdr. W. H., 390th S.L. Battery R.A., A.P.O. 725. *l*. *A.F.*
- 1927 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, London, N.8. *ent*.
- 1925 JARVIS, C. McK., 68, Clyfford Road, West End Road, Ruislip, Middlesex. *c*.
- 1938 JARVIS, F. V. L., B.SC., 21, Shirley Avenue, Sutton, Surrey.
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea, Hants. *l*.
- 1928 KETTLEWELL, Dr H. B. D., "Homefield," The Common, Cranleigh, Surrey. *l*.
- 1910 KIDNER, A. R., Erw, Morfa Nevin, Near Pwllheli. *l*.
- 1925 KIMMINS, D. E., 3, Avington Grove, Penge, London, S.E.20. *l*.
- 1933 KING, H., D.SC., F.R.S., "Gavarnie," Wise Lane, Mill Hill, London, N.W.7. *l*, *orn*.
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, London, S.W.3.
- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l*.
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l*.
- 1934 LINE, H. V., 11, Priory Avenue, Petts Wood, Orpington, Kent. *l*.
- 1933 LIPSCOMB, Capt. C. G., Misterton, Somerset. *l*. *A.F.*
- 1938 LISNEY, A. A., M.A., M.B., F.R.E.S., The Red House, Narborough, Leicester. *l*.
- 1936 LOWE, Major J. H. B., c/o Lloyds Bank Ltd., Cox's & King's Branch, 6, Pall Mall, London, S.W.1. *l*. *A.F.*
- 1931 MACNULTY, B. J., "Rutland," 67 All Saints Road, Sutton, Surrey. *l*. *A.F.*

YEAR OF
ELECTION.

- 1892 MAIN, H., B.S.C., F.R.E.S., F.Z.S., The Summer House, 65, Prior Park Road, Bath, Somerset. *l, nat. phot, c.*
- 1889 MANSBRIDGE, W., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool, Lancs. *l, c, etc.*
- 1932 MARCON, Rev. J. N., Christ Church Vicarage, Seaside Road, Eastbourne, Sussex. *l.*
- 1930 MARSH, D. G., "Brackla," 31, The Crossways, Sutton, Surrey. *l.*
- 1922 MASSEE, A. M., D.S.C., F.R.E.S., East Malling Research Station, Kent. *l.*
- 1932 MELLOWS, W. T., M.B.E., LL.B., "The Vineyard," Minster Precincts, Peterborough, Northants. *l.*
- 1938 MINNION, W. E., 57, Lloyd Court, Pinner, Middlesex. *l. A.F.*
- 1889 MOORE, H., F.R.E.S., 9 Hoopwick Street, Deptford, London, S.E.8. *l, hem, d, e l, e hym, e d, mi.*
- 1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone, Kent.
- 1920 MORISON, G. D., B.S.C., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen, N.B. *ec. ent.*
- 1937 MORTIMER, D. A., 20, Merridale Lane, Wolverhampton. Staffs. *hym.*
- 1937 MOWBRAY, M. J., 80, Woodlands Avenue, Wanstead, London, E.11. *ent. A.F.*
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey. *ent.*
- 1934 MUSGRAVE, A. J., B.S.C., A.R.C.S., c/o Barclays Bank Ltd., 41, Broadway, London, W.13. *ent. A.F.*
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l.*
- 1930 NIBLETT, M., 10, Greenway, Wallington, Surrey. *galls.*
- 1939 ODD, D. A., 11, Wickham Avenue, Cheam, Surrey. *l.*
- 1932 O'FARRELL, A. F., B.S.C., A.R.C.S., Agricultural Advisory Office, 7, Redlands Road, Reading, Berks. *od, cr, ent.*
- 1934 OLIVER, G. B., Harefield Road, Luton, Beds. *l.*
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, London, S.E.3. *l.*
- 1940 PAYNE, L. G., 22, Marksbury Avenue, Richmond, Surrey. *c.*
- 1940 PAYNE, R. M., 22, Marksbury Avenue, Richmond, Surrey. *c.*
- 1940 PEARSON, Miss B. M., 20, Merridale Lane, Wolverhampton, Staffs. *ent.*
- 1941 PELHAM-CLINTON, EDWARD C., Trebles Holford, Bishops Lydeard, near Taunton, Somerset. *l.*
- 1928 PERKINS, J. F., B.S.C., F.R.E.S., 95, Hare Lane, Claygate, Surrey. *hym.*
- 1933 PEYTON, A. G., 18, Manor Square, Stafford. *l.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, London, E.4. *od, l.*
- 1912 POULTON, Prof. Sir E. B., D.S.C., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)

YEAR OF
ELECTION.

- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, London, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 6, Billet Street, Taunton, Somerset.
l. mo.
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Link-
field Lane, Redhill, Surrey. *l.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middle-
sex. *l.*
- 1936 RICHARDSON, N. A., Denehurst, Buckingham Road, Bletchley,
Northants. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Sur-
rey. *ent. (Life Member.)*
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon,
London, S.W.20. *l.*
- 1939 RIPPON, C., M.A., J.P., F.R.E.S., "Red Lodge," Cold Ash, Newbury,
Berks. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough,
Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark, Notts.
l. n.
- 1936 ROYFFE, D. W., 33, Thornhill Road, Surbiton, Surrey. *l.*
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading, Berks. *l.*
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., "Windy Walls," Gatehouse
of Fleet, S.W. Scotland. *l.*
- 1936 RUSSELL, J. A. P., "Windy Walls," Gatehouse of Fleet, S.W.
Scotland. *ent. A.F.*
- 1915 RUSSELL, S. G. CASTLE, "Springetts," Seaview Road, Highcliffe-
on-Sea, Hants. *l.*
- 1908 ST AUBYN, Capt. J. G., F.R.P.S., 14, Purley Knoll, Purley, Sur-
rey.
- 1927 SCOTT, Col. E., M.B., "Hayesbank," Ashford, Kent. *l. A.F.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Ralli Bros., Ltd., Calcutta.
(Life Member.) l.
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough, Northants. *l.*
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1938 SHERRIN, W. R., A.L.S., F.Z.S., South London Botanical Institute,
323, Norwood Road, Herne Hill, London, S.E.24 *c. l.*
- 1898 SICH, ALF., F.R.E.S., "Coburg Court Hotel," Bayswater Road,
London, W.2. *l.*
- 1939 SIVITER-SMITH, P., "Squirrels," Little Aston Park, Streetly,
Staffs. *l. A.F.*
- 1921 SMART, Major H. D., R.A.M.C., M.D., D.SC., F.R.E.S., 172, High
Road, Salway Hill, Woodford Green, Essex. *l.*
- 1939 SMITH, S. GORDON, F.L.S., F.R.E.S., "Estyn," Boughton, Chester.
ent.
- 1938 SNELL, B. B., "Woodsome," Bromborough, Cheshire. *l.*
- 1941 SPARROW, R. W., 134, Regents Park Road, N.3. *l.*

YEAR OF
ELECTION.

- 1908 SPERRING, C. W., 85, The Manorway, Blackheath, London, S.E.3. *l.*
- 1938 STAFFORD, A. E., "Corydonis," 83, Colborne Way, Worcester Park, Surrey. *l.*
- 1927 STANLEY-SMITH, F., F.R.E.S., *Hon. Secretary*, "Hatch House," Pilgrims' Hatch, near Brentwood, Essex. *l.*
- 1928 STANLEY-SMITH, Mrs MAUD, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1937 STEDALL, H. P. P., "Cherry Cottage," Prestwood, Great Missenden, Bucks. *ent.*
- 1940 STEEL, W. O., 16, Upsdell Avenue, Palmers Green, London, N.13. *c.*
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham, Kent. *c.*
- 1938 STERLING, D. H., 36, Estella Avenue, New Malden, Surrey. *l.*
A.F.
- 1936 STIGANT, Miss B., 22, Brock Street, Bath, Somerset. *hortic. ent.*
- 1924 STOREY, W. H., 3, Highlands Road, Reigate, Surrey. *ent.*
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., Mount Pleasant, Pirton Road, Hitchin, Herts.
- 1929 STUBBS, G. C., Survey Office, Kuala Lumpur, Federated States of Malay.
- 1938 SUMMERS, E. J., 33, Cumnor Road, Sutton, Surrey. *c, hem.*
- 1934 SUTTON, G. R., 35, Bold Street, Southport, Lancs. *l, c.*
- 1916 SYMS, E. E., F.R.E.S., *Hon. Librarian*, 16, Selby Avenue, St Albans, Herts. *n, orth, od, t.*
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, London, S.W.6. *l.*
- 1913 TATCHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1934 TAYLOR, J. O., 176, Petts Wood Road, Petts Wood, Kent. *l.*
- 1925 TAYLOR, J. S., M.A., F.R.E.S., P.O. Box 45, Graaff-Reinet, Cape Province, Union of S.A. *l.*
- 1938 TETLEY, J., "White Cottage," Silverlea Gardens, Horley, Surrey. *ent.*
- 1935 TOMPKINS, F. H., "Clifton," 18, Forest Side, Worcester Park, Surrey. *ent.*
- 1937 TONGE, A. E., F.R.E.S., "Ashville," Trafford Road, Alderley Edge, Cheshire. *l.*
- 1934 TUNSTALL, H. G., 11, St James Avenue, Ewell, Surrey. *l.*
- 1940 TURNER, A. D., 19, Wychwood Close, Canon's Park, Middlesex. *ent.*
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. (*Hon. Member.*) *l, b, e l.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. CHAS., 9, Priory Road, Hook Road, Surbiton, Surrey. *l.*
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 7, Parkside Gardens, Wimbledon, London. S.W.19. *l.*

YEAR OF
ELECTION.

- 1930 WAKELY, S., *Vice-President*, 17, Warminster Road, S. Norwood, London, S.E.25. *l.*
- 1936 WALLIS-NORTON, S. G., O.i/c. Det. 20 S.T. (207) Coy., R.A.S.C., Lynn Farm, Haven Street, near Wootton, I.O.W. (*Life Member*). *ent. A.F.*
- 1936 Warrier, R. E., "Birchwood," Birchwood Tree Avenue, Swanley, Kent. *l.*
- 1939 WATKINS, NORMAN A., M.A., F.R.E.S., "Belcombe Court," Bradford-on-Avon, Wilts. *l. A.F.*
- 1920 WATSON, D., "Crossways," Hightown, Ringwood, Hants. *l.*
- 1928 WELLS, CLIFFORD, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., Linden House Hotel, 9, College Road, Epsom, Surrey. *l.*
- 1937 WELTI, A., F.R.E.S., "Foxbush," Tillingdown Lane, Caterham, Surrey. *l.*
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. Sussex. *l.*
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. Sir H. BECKWITH, K.B.E., M.B., M.S.LOND., F.R.C.S., F.R.E.S., 62, Hagley Road, Birmingham, 16. *l.*
- 1925 WILKINSON, H. B., LL.D., F.R.E.S., 2, Mitre Court Buildings, Temple, London, E.C.4. *l.*
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, London, E.4. *l.*
- 1938 WILLIS, J. R., Vine Cottage, West Horsley, Surrey. *l. A.F.*
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
- 1926 WOOTTON, W. J., "Wannock Gardens," Polegate, Sussex. *l.*
- 1927 WORMS, BARON DE, M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., *Council*, 12, Harcourt Terrace, Salisbury, Wilts. *l, orn.*

Members will greatly oblige by informing either of the Hon. Secretaries of any errors in, additions to, or alterations required in the above addresses and descriptions.

REPORT OF THE COUNCIL FOR 1940.

The 69th year of the Society's activities has been troubled throughout by the war, which has continued in increasing intensity. Your Council trust that in the circumstances its success in keeping the Society not just alive, but actively functioning, is appreciated by the members.

As the country's fighting strength grew, one member after another joined up, and 25 are known to be serving with the armed forces. As a slight indication of appreciation, it was decided to waive subscriptions from serving members. His departure on duty caused the resignation of our President-Elect, Mr J. O. T. Howard, and your Council filled the Vice-Presidential vacancy for the remainder of the year by the appointment of Mr C. N. Hawkins.

The meeting room at our new premises has proved adequate to our needs. Being used for diocesan purposes much less than in peace-time, it has been available for us at practically any time, a great advantage as compared with our previous quarters. This has enabled the Curator and Librarian to carry on the work referred to in their reports outside meeting hours. The special thanks of the Society are due to them and their helpers for this work. Our relations with the Chapter continue to be of the friendliest. In recognition of our extra use of the room, and because the "black-out" would be of advantage to the Society, the Council paid half the cost of the curtains. The heating has not always been satisfactory, due to exceptional conditions, but the Council is endeavouring to have this remedied.

The membership, at 261, shows no change. It is made up of 2 honorary, 5 life, 210 full, and 44 country members. During the year 8 new members have joined, 4 have died, and 5 have resigned, but one resignation received last year from a Service man has been cancelled. As the Treasurer's report shows, the number and amount of outstanding subscriptions is substantially higher than last year. This is serious, particularly in view of our concession to serving members and increasing expenditure, and your Council earnestly appeals to all concerned to show their loyalty to the Society by paying off their arrears without delay. The problem of dealing with members in arrear is the most unpleasant task your Council has to perform, and it is hoped that the problem apparently confronting the new Council will be effaced by the speedy payment of all arrears.

Modification of the normal programme for meetings was again necessary. In addition to the Annual Meeting, which closes the year, 19 indoor meetings were scheduled; one a month on Saturday afternoons in the winter, and two a month on Thursday evenings in the summer. In the circumstances it was decided to cancel the Annual Exhibition planned for the fourth Saturday in October, on which day an Ordinary

Meeting was nevertheless held, marking the transition from the summer to the winter scheme. Thanks are due to the Editor of the "Entomologist's Record" for publishing, and to Mr Castle Russell for his assistance in editing, particulars of potential exhibits for the Exhibition. At the 16 meetings the average attendance has been 31. Papers which it is hoped will be printed in the "Proceedings" have been read by Messrs H. W. Andrews, C. N. Hawkins, and S. Wakely, and the best thanks of the Society are due to those members. The lantern has been in use on one occasion.

Field meetings have been another problem. Early in the year your Council decided to continue them, on a restricted scale. A programme of 13 meetings was arranged, the districts chosen being all within easy reach of London. Eight meetings were held, though the numbers attending the last few were small. By the end of August changed conditions, following the capitulation of France, rendered it advisable to cancel the remaining fixtures. Short reports of those held will be printed in the "Proceedings," showing the names of the leaders, to whom the thanks and appreciation of members attending will already have been conveyed.

During the last three years our Corresponding Secretary, Mr Jacobs, has, by reason of pressure on his time, on a number of occasions tendered or suggested his resignation. He has hitherto been persuaded to stay on. Since the outbreak of war he has found it increasingly difficult to find the necessary time for the business of the Society, and since his whole-time embodiment in the Police Force it has seldom been possible for him to attend meetings. The Council have accordingly, with much regret, accepted Mr Jacobs' resignation, to take effect from the end of the year. He was first appointed in 1931 as assistant to Mr Stanley Edwards, whom he succeeded at the beginning of the following year. The Council wishes, on its own behalf and on that of the Society in general, to express its sincere thanks to Mr Jacobs for his services over the past nine years in carrying out much onerous work, often under very difficult conditions.

Reports by the Curator and Librarian are appended.

HON. CURATOR'S REPORT.

During the year the re-arrangement of the Society's collections of the Orthoptera and Neuroptera has been completed, and work is now proceeding with the Hemiptera.

Donations, fewer than usual, have been received as follows:—Mr R. J. Collins, Shetland Lepidoptera; Mr F. J. Coulson, British Homoptera; Mr S. N. A. Jacobs, Micro-lepidoptera.

HON. LIBRARIAN'S REPORT.

Early in the year the augmented Library Committee met and examined the books and papers in the Library, and decided to dispose of a number that they considered of no use to the Society.

It was also decided to allow members in Britain to borrow books by post, the member paying for postage. Only a few members have so far availed themselves of this, and the total number of books borrowed during the year has been less than usual, due, of course, to war conditions.

Re-labelling the books with the new address is in progress but not yet finished.

A card-index of all papers published in our "Proceedings" up to 1940 has been placed in our card catalogue under the author's name.

The following books, periodicals, separates, etc., have been added to the library during the year:—

By Donation:—"The British Noctuae and their Varieties," J. W. Tutt, by Mr J. A. Stephens.

By Purchase:—"Entomologist's Monthly Magazine"; "The British Blood-sucking Flies," B.M. publication.

Periodicals:—Entom. News; Vasculum; Entomologist; Amateur Entomologist; Natural History (American); Entomologist's Record.

Separates:—Smithsonian Inst. (Amer.); Field Mus. of Chicago; Hesperidiæ (Argentine), Capt. Hayward; U.S. Nat. Mus.

Various:—2 vols. Folia Zool., etc., Dr Strand; "Birds' attack on *P. brassicae*," Mr A. H. Hamm; "Beetles of Whitby," by Messrs H. Britten, Jun., and W. J. Fordham.

Trans., Proceedings, etc.—Essex Nat.; Proc. & Trans. Soc. Brit. Ent.; American Entomologist; Torquay N.H.S.; Bolletino Portici (Italy); Revista Ent. Argentine; Bull. Soc. Ent. de France; S.E. Nat. & Antiquary; Norfolk & Norwich Nat. Hist. Soc.; Rep. Ent. Soc. Ontario; Lloydia; Report U.S. Nat. Mus.; Eastbourne N. Hist. Soc. and Flora of Eastbourne; The London Naturalist, Journal of the London Nat. Hist. Soc.; London Bird Report for 1939.

HON. TREASURER'S REPORT, 1940.

The Society's members and friends have supported it so loyally and generously that despite the times I am able to report a small surplus. Once again I have had an anonymous donation of £20 for the Illustrations Fund. The members will join with me in gratitude to this most generous friend of the Society. Our thanks are also due to the Editors of the "Entomologist's Record and Journal of Variation" for printing, free of charge, the report prepared by Mr S. G. Castle-Russell on the exhibits intended for the 1939 Exhibition; to Mr Hy. J. Turner for bearing the cost of 350 reprints of that report; and to those who have given donations to the Publication Fund.

I wish to thank the members for so cheerfully maintaining their subscriptions in 1940 and I feel confident they will do the same in 1941.

BALANCE SHEET.

The value of our investments has increased since last year and exceeds cost by £110. Since my last report all formalities in connection with the appointment of the new Trustee for the Society's investments have been completed. Owing to prevailing conditions the procedure was more troublesome than usual. The two members to whom the Society is indebted for undertaking the responsibilities of Trusteeship are Mr J. H. Adkin and Mr W. Rait-Smith.

INCOME AND EXPENDITURE ACCOUNT.

Our subscription income at £125 15s was a matter of £10 less than in 1939 owing to the remission of the subscriptions of serving members. Here I take the opportunity of thanking those who made donations to offset the loss thus arising. Our net income from investments is naturally less owing to the increased rate of Income Tax. Turning to the expenditure and comparing it with that of 1939 we find that the Grant to the Publication Fund was £72, which is £11 less than before, and that there were, of course, no removal expenses. Instead of overspending, as we did in 1939, we have a modest surplus of £2 9s.

CAPITAL ACCOUNT.

Seven new members paid Entrance Fees.

LIBRARY FUND.

You will observe that we realised 16s by the sale of surplus items. This sufficed to cover the cost of new labels for our books. The £1 17s 4d for magazines purchased includes the cost of replacing some copies lost during the confusion of 1939.

PUBLICATION FUND.

It is pleasing to note an increase in the Donations. Sales of " Proceedings " are very slightly less. I am hopeful that the index of contributions to our " Proceedings " on which Mr Syms is engaged will lead to more copies being sold. The cost of printing the 1939-40 issue was £75, being nearly £15 less than the year before.

ILLUSTRATIONS FUND.

Of the fifth donation of £20 so kindly given us we have spent £6 6s 4d on blocks and £5 5s on printing illustrations, thus providing our volume with six fine plates.

Our thanks are due to Mr R. J. Burton, the Council's auditor, and to Mr F. J. Coulson, the Members' auditor, for auditing the accounts.

T. R. EAGLES.

INCOME AND EXPENDITURE ACCOUNT—Year to 31st December 1940.

Rent of Rooms ...	...	£45 9 0	Subscriptions (Arrears and Current) ...	...	£125 15 0
Insurance ...	...	0 17 4	Interest—		
Repairs, Cleaning, etc. ...	...	1 9 0	£154 14s 0d 4 % Consols ...	...	£6 3 8
Secretarial Expenses ...	...	11 0 0	£591 15s 3d 3½ % Conversion Stock ...	...	20 14 2
Treasurer's Expenses ...	...	3 11 10	Deposit Interest ...	...	2 0 4
		£61 18 8			£28 18 2
Subscriptions—			Income Tax ...	...	11 5 0
South Eastern Union of Scientific Societies ...	...	£1 2 6			17 13 2
Commons, Open Spaces, and Footpaths Preservation Society ...	...	0 10 6			
The Ramblers' Association (Southern Federation) ...	...	0 7 6			
		2 0 6			
Grant to Publication Fund ...	...	72 0 0			
Grant to Library Fund ...	...	5 0 0			
Balance, being Excess of Income over Expenditure carried to Balance Sheet ...	...	2 9 0			
		£143 8 2			£143 8 2

CAPITAL ACCOUNT—Year to 31st December 1940.

Transfer to Library Fund ...	...	£0 17 6	Balance at 1st January 1940 ...	...	£991 11 10
Balance at 31st December 1940 ...	...	991 11 10	Entrance Fees ...	...	0 17 6
		£992 9 4			£992 9 4

LIBRARY FUND—Year to 31st December 1940.

Book purchased	...	...	...	£0 13 6	Balance at 1st January 1940	...	...	£1 5 8
Magazines purchased	...	...	...	1 17 4	Sale of Books	...	...	0 16 0
Printing Labels	...	...	...	0 15 6	Transfer from Capital Account	...	...	0 17 6
Balance at 31st December 1940	...	...	...	4 12 10	Grant from Income and Expenditure Account	...	...	5 0 0
				£7 19 2				£7 19 2

PUBLICATION FUND—Year to 31st December 1940.

Printing Proceedings	...	...	...	£75 0 0	Balance at 1st January, 1940	...	...	£1 10 5
Postage of same	...	...	...	4 17 3	Donations	...	...	3 1 0
Balance at 31st December 1940	...	...	...	4 11 8	Sale of Proceedings	...	...	1 1 0
					Interest on 3½% War Stock (Misses E. F. and L. M. Chapman)	£10 10s, less Income Tax £3 13s 6d	...	6 16 6
					Grant from Income and Expenditure Account	...	...	72 0 0
				£84 8 11				£84 8 11

ILLUSTRATIONS FUND—Year to 31st December 1940.

Blocks	...	...	...	£6 6 4	Balance at 1st January 1940	...	...	£29 5 5
Printing Illustrations	...	...	...	5 5 0	Donation	...	...	20 0 0
Balance at 31st December 1940	...	...	...	37 14 1				
				£49 5 5				£49 5 5

ABSTRACT OF PROCEEDINGS.

10th FEBRUARY 1940.

Dr E. A. COCKAYNE, A.M., F.R.C.P., F.R.E.S., President, in the Chair.

Mr D. B. Baker, 21 Quarry Park Road, Cheam, Surrey, was declared elected a member.

Mr R. F. Haynes exhibited three specimens of *Actias selene*, Hb. (the Indian Moon Moth). Out of a brood of about 30 larvae, 6 pupated in August 1939 and a few moths emerged in September. The larvae, in this country, can be reared on garden plum.

Mr S. Wakely exhibited examples of ab. *schultzi*, Siebt., the dark form of *Ennomos autumnaria*, Wrbg., from Kent.

Mr Howard exhibited a specimen of *Lycia hirtaria*, Clrck., ab. *denigrata*, Hawkns., taken wild in Hampstead, 12.iv.1938, a new aberration first described by Mr C. N. Hawkins in "The Entomologist," February 1940, p. 28. Also an *Arctia caja*, L., bred during October 1939 from a Cornish ♀, with both wings and the antenna on the right side reduced in size though perfectly formed.

Dr G. V. Bull exhibited a ♀ *Polyommatus (Lysandra) coridon*, Poda, with pale streaks on the right forewing; *Lithosia caniola*, Hb., from Rye; and reported that on 19th December last he saw swallow with leaves and catkins.

Mr N. G. Wykes then gave an address on the section of the genus *Ornithoptera* (Bird-winged Butterflies), which comprised the largest and most brilliant species. He illustrated his remarks by a series of excellent coloured drawings of all the species and of most of the subspecies and racial forms. This section of the huge genus *Papilio*, L., is often called *Troides*. He furnished a list of the species, subspecies and aberrations to which he had referred.

TROIDES.

Species.	Subspecies.	Form or Race.
<i>victoriae</i> , Gray.	<i>regis</i> , Roths. <i>isabellae</i> , Roths. <i>victoriae</i> , Gray.	<i>reginae</i> , Salv. <i>rubianus</i> , Roths.
<i>alexandrae</i> , Roths.		
<i>priamus</i> , L.	<i>lydius</i> , Fldr. <i>croesus</i> , Wall. <i>aesacus</i> , Ney. <i>priamus</i> , L. <i>hecuba</i> , Rüb. <i>arruana</i> , Fldr. <i>poseidon</i> , Dbldy. <i>pronomus</i> , Gray.	<i>euphorion</i> , Gray. <i>richmondia</i> , Gray. <i>caelestis</i> , Roths. <i>bornemannii</i> , Pgnst. <i>miokensis</i> , Ribbe. <i>urvilleanus</i> , Guér.
<i>chimaera</i> , Roths.	<i>chimaera</i> , Roths. subsp. <i>flavidior</i> , Roths.	<i>dracaena</i> , J. T.
<i>rothschildi</i> , Obthr.		
<i>tithonus</i> , Deh.	<i>tithonus</i> , Deh. <i>prominens</i> , J. & N.	<i>waigeuensis</i> , Roths.

TROIDES.

Species.	Subspecies.	Form or Race.
<i>procus</i> , Roths.		
<i>goliath</i> , Obthr.	<i>goliath</i> , Obthr.	<i>samson</i> , Niep.
	<i>atlas</i> , Roths.	<i>titán</i> , Grs.-Sm.
	<i>supremus</i> , Röb.	<i>joiceyi</i> , N. & T.
<i>paradisea</i> , Stdgr.	<i>paradisea</i> , Stdgr.	<i>flavescens</i> , Roths.
	<i>paradisea</i> , Stdgr.	ab. <i>auriflua</i> , Fruh.
		<i>arfakensis</i> , J. & N.
<i>meridionalis</i> , Roths.	<i>meridionalis</i> , Roths.	<i>tarunggarensts</i> , J. & T.

9th MARCH 1940.

The PRESIDENT in the Chair.

Capt. R. A. Jackson, R.N., The Hermitage, Bishops Waltham, and Mr A. D. Turner, 19 Wychwood Road, Canons Park, Middlesex, were declared members.

The President exhibited 6 *Oria* (*Synia*) *musculosa*, Hb., taken in Wiltshire, August 1939, at light, showing variation. Markings in one buff, in another darker (greenish brown), one with very white thorax and wings, markings reduced.

Mr Hy. J. Turner exhibited a short varied series of *Perconia strigillaria*, Hb. 1. Typical ♂ and ♀ white, with fuscous irroration; all the lines present, including a subterminal dark line. The transverse lines are very unstable in position in this species. 2. ab. *herpeticaria*, Rmbr., antemedial and median lines of forewing strong and approximated. ♀. 3. ab. *grisearia*, Stdgr., with the white ground colour nearly suppressed by grey suffusion. Lines strong. ♂. 4. ab. *cretaria*, Ev., very much whiter and weakly marked, lines almost suppressed. ♀. 5. A form comparable with ab. *herpeticaria* with the line near the hind margin practically suppressed on the forewing, wide space between the two median lines on both fore and hindwings with less fuscous irroration, giving the appearance of a band, other lines distinct. ♀. 6. A very dark melanic form, all white ground suppressed by deep fuscous shade sufficient to render the transverse marking very indistinct. ♂.

Mr Wakely exhibited a short series of *Abraxas grossulariata*, L., bred from Norwood, showing the normal variation from pale to moderately marked examples. Also two parasites, *Casinaria vidua*, Gr., which had emerged from the larvae. He also showed living examples of the beetle, *Mezium affine*, Boield., from Finsbury.

Mr F. D. Buck exhibited a specimen of *Bryocharis inclinans*, Gr. (Col.), found under a dead log in Epping Forest (3.iii.40); also a series of *Tetratoma fungorum*, F. (Epping Forest, 3.iii.40), taken on *Polyporus*. Although many were found beneath the barks of the log, he found none actually inside the fungus.

Seasonal experiences were recounted by several members.

11th APRIL 1940.

The PRESIDENT in the Chair.

Mr S. R. Ashby exhibited a large number of Aquatic Coleoptera, including the genera *Haliplus*, Latr., *Hygrobia*, Latr., *Deronectes*, Shp., *Agabus*, Leach, *Hydroporus*, Clair., *Ilybius*, Er., *Colymbetes*, Clair., *Dytiscus*, L., *Acilius*, Leach, and made special reference to *Agabus bipustulatus*, L., pointing out the red ab. *solieri*, Aub., *Dytiscus lapponicus*, Gyll., from the Isle of Mull, *D. dimidiatus*, Berg., *Orectochilus villosus*, Müll., *Hydrophilus piceus*, L., *Hydrochaeres caraboides*, L., and a pair of *Spercheus emarginatus*, Schal., taken by the late Mr T. R. Billups at West Ham. He also exhibited many species of Aquatic Hemiptera, including the genera *Hydrometra*, Latr., *Velia*, Latr., *Geris*, Fb., *Nepa*, L., *Naucoris*, Fb., *Aphelocheirus*, Ww., *Ranatra*, Fb., *Notonecta*, L., and *Corixa*, Geoff.

Dr G. V. Bull exhibited four specimens of *Biston strataria*, Hufn., bred from larvae obtained at Ashridge. They were of the suffused brownish form. He reported the scarcity of spring larvae up to the present.

Mr August exhibited a female of *Lycia hirtaria*, Clrck. with ova, from Hyde Park.

Mr T. R. Eagles exhibited a species of *Chara* from the New River, Enfield, an aquatic Cryptogam of which genus some half a dozen species occur in ponds, canals and stagnant water around London.

Mr D. H. Sterling exhibited a pupa of *Acrionicta alni*, L., in a stem of Loganberry provided for the larva.

Mr S. Wakely exhibited a shell of the Mollusc, *Anodonta cygnea*, L., from Edenbridge; series of the following species whose larvae are found on aquatic plants: *Nymphula stagnata*, Don., *N. stratiotata*, L., *Cataclysta lemnata*, L., *Hydrocampa nymphaea*, L., and *Acentropus niveus*, Oliv.; he also showed the "fire brat," a Lepismid, *Thermobia furnorum*, Rov., allied to the "silver fish," *Lepisma saccharina*, L.

Dr Blair exhibited numerous seashore insects found in crevices of rocks, under stones, etc., including Coleoptera: *Aepus marinus*, Ström, *A. robini*, Lab., *Micralymma brevipennis*, Gyll.; Hemiptera: *Aepophilus bonnairei*, Sig.; Diptera: *Ceratinostoma ostiorum*, Hal., and puparium; Chelifer: *Obisium maritimum*, Leach.

25th APRIL 1940.

Mr J. O. T. HOWARD, M.A., Vice-President, in the Chair.

Mr S. Wakely exhibited a short series of *Elachista cinereopunctella*, Haw., bred from larvae feeding in leaves of *Carex glauca*, L., at Riddlesdown; also larvae and pupae of the same species.

Dr G. V. Bull exhibited examples of *Ortholitha mucronata*, Scop. (*palumbaria*, Schiff.), from Rannoch, Aviemore, New Forest and Ashdown Forest; also the recently described form (or species) known as *O. scotica*, Cklyne.

Mr J. A. Stephens exhibited Coleoptera taken in Cobham Park, Kent: *Geotrupes typhoeus*, L., taken in earth cast out of rabbit burrows, 2.vi.39; *Platypus cylindrus*, Fb., in abundance from under bark of old tree stumps, usually rare locally, 30.vi and 28.vii, 1939; *Prionus coriarius*, L., from the heart of a large trunk of ash; not common, 16.viii.39; *Anisotoma (Liodes) cinnamomea*, Pnz., rare, 19.iv.40, and *Throscus carinifrons*, Br., from leaves under oak tree, rare, 22.iv.40.

Several members noted the various species they had seen so far this spring and Capt. R. A. Jackson gave a list of the species of Lepidoptera he had seen this spring with the dates of first appearance, mostly at Bishop's Waltham, Hants. The list included: *Theria rupicaprararia*, Schiff., 2 ♂, 11th February, very common on 28th; *Nyssia (Apocheima) hispidaria*, Schiff., and *Alsophila aescularia*, Schiff., at Richmond, 11.iii; *Phigalia pedaria*, Fb. (*pilosaria*, Schiff.), and *Erannis leucophaearia*, Schiff., 26.ii, at Richmond; *Achlya (Polyplocia) flavicornis*, L., 16.ii; ♂ *Orthosia (Taeniocampa) populi*, Strm. (*populeti*, Fb.), 22.iii; *O. (T.) munda*, Esp., *O. (T.) incerta*, Hfn., *O. (T.) pulverulenta*, Esp., 23, 24.iii; *Brephos parthenias*, L., very common, 24.iii; *Trichopteryx polycommata*, Hb., ♂ 30.iii, ♀ 31.iii; *Calostigia multistrigaria*, Haw., *Sarothripus revayana*, Tr., 31.iii; *Lycia hirtaria*, Clrek., Hyde Park, 4.iv; *Vanessa io*, L., *V. atalanta*, L., *V. c-album*, L., 9.iv; *V. cardui*, L., *Pieris brassicae*, L., *P. napi*, L., 21.iv; *Lasiocampa quercifolia*, L., larva on sloe, 14.iv; *Nygmaea phaeorrhoea*, Haw. (*chrysorrhoea*, L.), larvae out sunning; *Euproctis similis*, Fues., larvae still in their houses, 8.iv; *Parasemia plantaginis*, L., larvae swarming, 21.iv.

9th MAY 1940.

The PRESIDENT in the Chair.

Mr Gordon Alan Davis, 76 Station Road, Chingford, and Mr Wm. Owen Steel, 16 Upsdell Avenue, Palmers Green, London, N.13, were declared members.

Mr H. W. Andrews exhibited two species of spring Diptera, *Gonia fasciata*, Mg., and *Chilosia grossa*, Fln., both taken at flowers of colts-foot at Stone, near Dartford, 31.vi.40. *Gonia fasciata* is uncommon, but has been recorded from the Isle of Wight and Eastbourne. *Chilosia grossa* is not at all uncommon but usually associated with sallow blossom.

Mr H. Moore exhibited a box of miscellaneous insects from Rhodesia including large Orthoptera, Coleoptera, and Hymenoptera.

Mr Jacobs exhibited a long series of the beautiful micro-lepidopteron, *Lithocolletis sylbella*, Haw., bred from mined leaves of maple; Downe, Kent. One specimen was an aberration in which much of the dark marking was absent and that remaining was quite well expressed.

Mr Eagles exhibited the Coleoptera, *Hylobius (Curculio) abietis*, L., and *Thanasimus formicarius*, L., taken at newly cut pine stumps at the Effingham Field Meeting, 4.v.40. He also showed pine shoots attacked by larvae of the pine shoot moth, *Evetria busliana*, Schiff. Also he ex-

hibited the two following British wild plants: *Asarum europaeum*, L., a member of the *Aristolochia* family and rare in this country; and the common parasitic toothwort, *Lathraea squamaria*, L., growing on hazel roots.

Mr S. Wakely exhibited a pupa of *Hesperia malvae*, L., of which the larva was found feeding on agrimony (*Agrimonia eupatoria*, L.), at Gurnard, Isle of Wight; and also forms of *Agrotis lunigera*, Steph., and of *A. nigricans*, L., from different localities.

Mr J. O. T. Howard exhibited short series of *Agrotis vestigialis*, Hufn., *A. obeliscæ*, Hb., *A. tritici*, L., and *A. cinerea*, Hb., from various localities to illustrate the subsequent discussion on the Agrotids.

Dr G. V. Bull exhibited various forms of *Agrotis* species, including *A. exclamatoris*, L., *A. ripae*, Hb., with a reddish specimen from Torquay, *A. praecox*, L., from a Hertfordshire garden, and extreme light and dark forms from Rye; also a *Lycia hirtaria*, Clrck., well marked with pale grey instead of the usual brown coloration. He also reported *Brenthis euphrosyne*, L., and *Pseudopanthera (Venilia) macularia*, L., flying on 7th May, and that he had seen more *Euchloë cardamines*, L., and *Lycænopsis argiolus*, L., in W. Kent than ever before.

Mr E. E. Syms then exhibited and described an apparatus he had made for the observation and study of the habits of the cell-making species of Hymenoptera.

An interesting discussion on Agrotids then took place.

23rd MAY 1940.

Mr J. O. T. HOWARD, M.A., Vice-President in the Chair.

Mr C. N. Hawkins exhibited a sprig of willow, *Salix caprea*, L., which, after the true catkins had fallen, produced growths resembling catkins apparently composed of leafy structures but having stamens with anthers developed between these small leaves or bracts. No satisfactory explanation was, so far, forthcoming.

Mr F. D. Coote exhibited the bird's-nest orchid, *Neottia nidus-avis*, Rich., obtained at Bookham, and pointed out that this plant, usual on chalky soil, was not often found on the clay; ova of *Humeris lucina*, L., and of *Callophrys rubi*, L., and stated that the female of the latter species had oviposited in the tips of shoots of *Helianthemum*.

Mr V. August exhibited a half-grown larva of *Apatura iris*, L., from N.W. Sussex.

Mr T. R. Eagles exhibited the fungus, *Polyrorus sulphureus*, Fr., and remarked that this was one of the few fungi said to be attached to the yew tree. He also showed a young larva of *Lycænopsis argiolus*, L., found on shoots of *Cotoneaster*.

Mr H. A. W. Harris read a few notes on the early stages of *Stauropus fagi*, L. "Unfortunately the female is almost impossible to obtain at present as it is most readily taken flying around a light inside woods early in the evening. It rarely settles on the sheet, but is unmistakable

when in flight as there is nothing else of that size about so early. We lit up at 9.45 and found that during June and July the female came to light just before 10, when it was still quite easy to see in the open. The 22 ova were laid on 29th June and were creamy-white in colour. On 3rd July a dark spot appeared, on the 5th they turned to a translucent blue and hatched on 8th July—after ten days. As they were supposed to live for a week on the eggshell I left them without food and was away four days. On my return several had changed their skin and I introduced birch, beech and oak to the glass-topped pill box. On the 13th (after five days) beech was being eaten so I divided the brood into four boxes. There were 19 larvae left, three ova having failed to hatch. On the 20th, skin changed for the second time. The only other point worth noting about this brood is that on 1st August (after one month) they all gradually changed over to ash on which they finally fed up. As this brood began to eat after four days and not seven as stated in the usual account, a second batch, which hatched on 19th July, were started straight away on oak and beech, both of which were eaten on the second day, and although the shell was partly eaten they certainly did not mind being separated from it. On 1st August when first brood preferred oak the second brood ate beech exclusively.

Pupation.—As I thought dead leaves would go mouldy during the winter, I tore up blotting paper and brown paper about the size of leaves and this proved to be a very satisfactory substitute. Emergence started 15th May. As I found one with a rubbed forehead I opened up the rest of cocoons and found that one had failed to escape from the pupa case. A few were lost whilst changing skin, the number of humps and long legs seemed to cause a lot of trouble."

Mr Harris then exhibited Hymenopterous parasites attached to larvae of *Dasychira fascelina*, L., also living larvae of *D. fascelina* and *Crocallis elingvaria*, L.

Mr A. Bliss exhibited a larva of *C. elingvaria* having a black lateral stripe on the abdominal somites; also a larva of *Lithosia lurideola*, Zinck.

Mr S. N. A. Jacobs exhibited an example of *Sitotroga cerealella*, Oliv., a pest of growing grain in America and of stored grain in this country.

Mr S. Wakely exhibited larvae of *Semiothisa brunneata*, Thunbg. (the Rannoch looper), from Blair Athol.

Mr E. E. Syms exhibited the Dipteron, *Microdon eggeri*, Mik., both alate and apterous forms, and described experiments suggested by cases of delayed development of the wings, which supported his theory that the development of wings depended on light.

13th JUNE 1940.

The PRESIDENT in the Chair.

Messrs L. G. and R. M. Payne, 22 Marksbury Avenue, Richmond, Surrey, were declared elected as members.

Mr H. W. Andrews exhibited a very rare British Trypetid Fly (Dip.), *Oxyna parietina*, L., taken in some number on the marshy banks of the Thames, and read notes on its occurrence in this country. (See *Trans.*)

He also showed *Stenopterix hirundinis*, L., a dipterous parasite of the House Martin.

Mr S. R. Ashby exhibited a series of *Gymnetron beccabungae*, L. (Col.), found fairly common by sweeping at Bookham Common in 1915-16-17; also a series of *G. veronicae*, Gm., and its black variety *nigrinum*, Wa., taken very commonly at a damp spot at Bude, Cornwall, in May 1911.

Mr H. Moore exhibited British queen wasps and read the following note:—"Queen wasps have been very abundant this spring in Mid-Essex, *V. vulgaris* and *V. germanica* in about equal numbers. Nearly 200 were taken in three weeks, and 26 and 22 the last two days of May in the garden of Clovile Hall, West Hanningfield. Amongst them were found two specimens of *Vespula rufa* and an early dwarf worker of *vulgaris*."

Dr K. G. Blair exhibited living larvae of *Chiasma (Strenia) clathrata*, L., from a Wiltshire parent; these included a violet form not mentioned by Buckler, Wilson or South; also some beetles, *Orchesia micans*, Panz., together with the Braconid parasite *Meteorus obfuscatus*, Nees, reared with them from a lump of the fungus *Polyporus giganteus* sent him by Mr Denvil. The fungus was found in March, the beetles and parasites emerging at the end of May and in the first few days of June. This beetle is well known as being very subject to the attacks of parasites, very frequently more than one species being present. Thus from a fungus found at Mill Hill in March, 1932, the Proctotrupid *Cryptoserphus parvulus*, Nees, commenced to emerge on 12th May, the beetles and the above *Meteorus* not appearing till the middle of June. From the same host from Edgware the *Meteorus* appeared on 20th May, together with the Ichneumonid *Thersilochus orchesiae*, Morl., this latter species being also reared in March 1933 from a piece of the fungus from Hartingfordbury, Herts., received from Mr Eagles. Morley also records the Pimpline *Lissonota distincta*, Bridg., as possibly from this host. This Dr Blair had reared from *Tinea cloacella*, Haw., and it is probable that Morley's record should be attached to one of the Tineids often found in the same fungus and not to the *orchesiae*. *Hemiteles niger*, Tasch., also recorded by Morley from the same host, is probably a hyperparasite. Other beetles are also frequently present in the same fungus; thus from the Mill Hill specimen above mentioned a large number of *Phyllodrepa ioptera*, Steph., were reared as well as *Mycetophagus piceus*, F., and a species of *Cryptophagus*.

Mr T. R. Eagles exhibited the Longicorn beetle *Anaglyptus mysticus*, L., reared from a beech log, Epping Forest.

Mr C. N. Hawkins exhibited mined leaves of the primrose.

Dr G. V. Bull exhibited *Harmodia (Dianthoea) lepida*, Esp. (*carpophaga*, Bork.), which were of a more yellow shade of ground colour compared with the white form characteristic of those from the Dungeness area; also a parasite, subsequently determined as *Apanteles spurius*, Wesm., from the larva of *Episema (Diloba) caeruleocephala*, L.; and a Cynipid gall, *Aulax glechomae*, Htg., on ground ivy, *Nepeta hederacea*, Tre.

Mr F. D. Buck exhibited the following Coleoptera from Epping Forest, l.vi.40:—*Aulonium trisulcum*, Gf., *Hyphophloeus bicolor*, Ol., *Eccoptogaster multistriatus*, Mn., and *E. scolytus*, F., all under bark of same elm trunk; *Grammoptera holomelina*, Po., and *Nitidula carnaria*, Sl., swept from blossom on west edge of Forest; and *Leptura scutellata* from pupae taken in oak.

Mr Hy. J. Turner exhibited numerous species of Lepidoptera collected for him in Ecuador by Mr Wm. Clarke MacIntyre. Some of the areas worked were those which 60 or 70 years previous had been brought to our notice by the collectors who procured so much towards the collections of Hewitson and Wilson Saunders. The collection shown, only a fraction of the material obtained, included four species of the tailless forms of the genus *Papilio* of which perhaps *P. epenetus*, Hew., an almost wholly black species, was the most remarkable. The *Pieridae* was represented by species of four genera: *Pieris*, with a white species having a very wide black border on all wings and a remarkable dusky-striped underside of hindwing, *P. mandela*, Fldr.; *Terias*, with a very small species, *T. cleathea*, Fldr., with a white ground well margined with black and a well-marked yellow inner margin; a *Daptonoura*, much resembling our *Aporia crataegi*, L.; the genus *Catopsilia*, all robust species, had two representatives, *C. rurina*, Fb., with its yellow patch on the forewing affording an idea of the European *G. cleopatra*, L., and *C. argante*, Fb., a brilliant orange species; and four species of the remarkable *Dismorphia*, *D. othoë*, Hew., *D. nemesi*, Latr., *D. fortunata*, Luc., and a series of forms of the variable and beautiful species *D. amphione*, Cr., all showing sexual dimorphism, and resemblance to distasteful species of other families. No less than seven genera represented the *Danaidae*; robust species like *Lycorea halia*, Hb.; delicate clear-winged species like *Hymenitis andromica*, Hew.; several richly marked species like *Mechanitis macrinus*, Hew., and *Melinaea idas*, Fldr. Of the *Nymphalidae* there were four genera represented: *Colaenis* by *C. julia*, Fb.; *Dione* *vanillae*, L., with silver on the underside of hindwing; *Heliconius* by *H. atthis*, D. & H.; and *Callicore* by the "88" *C. marchallii*, Guér. The genera *Taygetis*, *Euptychia*, and *Tissaphone* were represented in the *Satyridae*, and a *Brassolis*, with several striking species of *Heterocera* were also shown.

Mr S. P. Doudney exhibited examples of *Nyssia zonaria*, Schiff., bred from females captured at Conway, N. Wales.

Mr H. Britten, junior (a visitor), exhibited a box of parasitic Hymenoptera and gave details of breeding and obtaining material for his study.

A number of members then gave notes on the season.

27th JUNE 1940.

The PRESIDENT in the Chair.

Dr K. G. Blair exhibited a series of the Longicorn beetle, *Rhagium bifasciatum*, F., from various localities in Britain illustrating its variation, and contributed the following note (see *Trans.*).

Mr T. R. Eagles exhibited larvae of the Sawfly of the Solomon's Seal, *Phymatocera aterrima*, Kl., and ova with newly hatched larvae of *Mimas tiliae*, L.

Mr F. D. Coote exhibited living examples of *Limenitis camilla*, L. (*sibilla*, L.), *Argynnis adippe*, L., and *Polygonia c-album*, L., from Ashstead, and ova of *Procris staticis*, L., and of *Abraxas sylvata*, Scop.

Mr Coote, on behalf of Mr Hy. J. Turner, exhibited a store-box of *Syntomidae* and communicated the following note: "The *Syntomidae* is a Family of small moths comprising between two and three thousand species. Most species have the hindwings very small, with the abdomen often brilliantly coloured, and a large proportion of the species are clear winged. Like the Zygaenids, which numerous species resemble in appearance and habits, they are day-flying moths and frequenters of flowers, and like them, too, they are then easily captured, although when on wing they are as active as the Aculeate Hymenoptera, which so many of them resemble. So marked is this resemblance that it has been stated that each species resembles its own species of Hymenoptera (*Vespa*, *Polistes*, *Odynerus*, etc.). Not only in general appearance is the resemblance apparent but the size, shape, and movements of the Syntomid bears much likeness to the Hymenopterous model. As in Zygaenids, the tenacity of life is also very strong but in spite of these resemblances the two families are quite distinct. Syntomids occur in all the purely tropical regions of the earth, but do not filter through either to the North or to the South. Europe proper has only four species and not one occurs in this country. Edward Newman ("British Moths") reported *Naclia ancilla*, L., and described and figured it on p. 473 of his "British Moths," on the strength of one reported example. But with species which are gregarious in habits like these in the Family *Syntomidae*, other examples would surely have been met with if it had been native."

Mr Britten, Jnr., exhibited a number of Chalcids including one from the corky bark of elm parasitical on the larva of the beetle, *Maydalis armigera*, Fourc. He also showed a gall on the guelder rose, *Viburnum opulus*, L., which was probably caused by a fungus.

Mr C. N. Hawkins contributed some extempore notes on Lepidopterous pupae.

11th JULY 1940.

The PRESIDENT in the Chair.

Dr Cockayne exhibited three larvae of *Pachetra leucophaea*, View., in the penultimate instar and a light and a dark one in the final (9th) instar, Wye, Kent; a larva of *Perizoma blandiata*, Schiff., Rannoch; a young larva of *Zygaena achilleae*, Esp., Morven; and a larva of *Epirrhoë rivata*, Hb.

On behalf of Mr Hy. J. Turner, Mr Coote exhibited a further box of *Syntomidae*, mainly from S. America, but including two European species, *Dysauzes (Naclia) ancilla*, L., and *D. punctata*, Fb., the former of which has been recorded from Britain.

There was a special exhibition of Household Insects.

Mr T. R. Eagles exhibited the "cheese skipper" fly, *Piophilæ casei*, L., and other household insects including the Coleoptera, *Calandra granaria*, L., *Megatoma undata*, L., *Anobium striatum*, Ol. (*domesticum*, Frery.), *Attagenus pellio*, L., and *Dermestes lardarius*, L., with *Pyralis farinalis*, L. (Lep.), and species of *Blattidae*.

Mr S. Wakely exhibited the following Micro-lepidoptera which were notably domestic or household insects: *Plodia interpunctella*, Hüb., *Ephestia elutella*, Hüb., *Borkhausenia pseudospetella*, Staint., *B. minutella*, L., *Oinophila v-flavum*, Haw., *Tinea pellionella*, L., *T. pallescentella*, Staint., *T. fuscipunctella*, Haw., *Monopis crocipitella*, Clem., *M. ferruginella*, Hüb. (for comparison with previous species), *Tineola biselliella*, Hümm., and *Trichophaga tapetiella*, L.

Mr S. R. Ashby exhibited the following species of insects commonly found in dwellings:—Thysanura: *Lepisma saccharina*, L., the "silver fish;" Orthoptera: *Blattella germanica*, L., *Blatta orientalis*, L., *Periplaneta americana*, L., *P. australasiae*, Fb., and *Gryllus domesticus*, L.; Hemiptera: *Cimex lectularius*, L.; Coleoptera: *Larva (Bruchus) pisorum*, L. (*pisi*, L.), *L. affinis*, Fröh., *L. rufimanus*, Boh., *L. lentis*, Boh., *Calandra granaria*, L., *C. oryzae*, L., *Tenebroides mauritanicus*, L., *Dermestes lardarius*, L., *Necrobia ruficollis*, Fb., *Xestobium rufo-villosum*, D. G. (*tessellatum*, Fb.), *Niptus hololeucus*, Fab., *Mezium affine*, Boiel., *Blaps mucronata*, Latr., *B. similis*, Latr., *Tenebrio molitor*, L., *T. obscurus*, Fb., *Alphitobius diaperinus*, Pz., and *A. piceus*, Ol.; and an Asiatic species, *Coccotrypes dactyliperda*, Fb., from date-stones, taken at Wembley, Middx., October 1920.

Mr J. A. Stephens exhibited Coleoptera taken at Cobham Park this season by himself: 1. *Caenopsis fissirostris*, Walt., taken on 4.v.40, in leaves. This species is rare and new to this part of the country. Two were taken the same day by Mr Grant. 2. *Gronops lunatus*, Fb., taken 17.v.40. Taken in leaves (oak). Rare. 3. *Thanasimus formicarius*, L., under bark of oak, fallen bough, 17.v.40. 4. *Leptura scutel-*

lata, F., 2.vii.40, from fallen hornbeam, and out of stump of hornbeam. Rare, Cobham Park, only place in Kent where taken.

Mr F. D. Buck exhibited *Xestobium rufo-villosum*, D. G., and *Corynetes coeruleus*, D. G., from a timbered house in Bracon Ash, near Norwich. The larvae of *C. coeruleus* preys on those of *X. rufo-villosum*.

Mr L. G. Payne exhibited specimens of *Cetonia aurata*, L., *Pogonochaerus hispidulus*, Pill. (*bidentatus*, Thoms.), and *Mcloë proscarabaeus*, L.

Dr K. G. Blair exhibited the Tineid moth, *Argyresthia goedartella*, L., the larva of which feeds during the winter months in the catkins of birch. He remarked how on 31st March last the trunks of the birch trees on Wimbledon Common were sheathed with a shining silvery web, and on investigation larvae were found in crevices of the trunk, beneath flakes of loose bark, and some boring into the bark itself, though others apparently went down to the ground. The moths commenced to emerge about mid-June, and some were still alive. He noted that he had previously bred the moth from *Daldinia concentrica*, (Bolt.) Ces. & De Not., and other fungi, which seemed a curious habitat for catkin-feeding larvae, though in the light of subsequent observation it was obvious that the larvae descending from the catkins must have entered the fungi for the purpose of pupation. Also living specimens of the Forest Fly (*Hippobosca equina*, L.).

Several members made comments on the present season.

25th JULY 1940.

The PRESIDENT in the Chair.

The decease of Miss M. Fountaine was reported.

Mr H. Britten, Jr., 21 Tollers Lane, Old Coulsden, Surrey, was declared a member.

Mr August exhibited examples of *Apatura iris*, L., from Britain and France.

Mr Hutchings exhibited a full fed larva of *Sphinx ligustri*, L., found at Ewell, Surrey.

Mr F. D. Coote exhibited an example of *Mimas (Dilina) tiliac*, L., taken in Cheam, almost wholly brown in colour with only a slight trace of the usual green, and referable to ab. *brunnea*, Bart., figured in vol. ii of Seitz.

Mr Coote also exhibited, on behalf of Mr Hy. J. Turner, a varied series of *Anchocelis helvola*, Gn. (*rufina*, L.), including an example of ab. *unicolor*, Tutt, to which form many of our British specimens can be allocated. Tutt refers to an ochreous form with a greenish tinge and reddish fascia, ab. *ochrea*. This, Mr Turner said, he had never seen, but one example shown has definitely greenish stigmata, and all the transverse lines which margin the three bands are also greenish. The central band is curiously made up of a costal fascia and an inner marginal fascia connected by just touching the dark lower portion of the

reniform stigma, cf. *lota* and *macilenta*, in both of which this character is strongly developed. There is also an exceedingly pale form (possibly worn).

8th AUGUST 1940.

The PRESIDENT in the Chair.

Dr E. A. Cockayne exhibited an error of Metamorphosis (Prothetely) in a larva of *Smerinthus*, hybrid *hybridus*, Stephens.

Mr S. Wakely exhibited ab. *fasciata*, TgwL., of *Spilosoma lutea*, Huf. (*lubricipeda*, L. in pt.), from Clapton.

Mr T. R. Eagles exhibited a blackish ovum of *Laotoë* (*Smerinthus*) *populi*, L., apparently parasitized; two bred examples of the Tortrix, *Evetria buoliana*, Schiff., and ova of the Chrysopid fly, *Chrysopa flavus*, Scop.

Mr F. D. Coote exhibited a living *Nematois fasciella*, Fab., from Ashtead, Surrey, 7.viii.40. Meyrick, "Handbook," gives only Kent, Suffolk and Cambs.

On behalf of Mr Hy. J. Turner, Mr Coote exhibited two species of the Catagrammidi Group of S. American Nymphalids: *Perisama op-pelii*, Latr., and ab. *bouchieri*, Btlr., of the ssp. *rubrobasalis*, Rbl., of *P. bonplandii*, Guér., both from Ecuador. Seitz gives more than 40 species, characterized by velvety-black upper surface of the wings with glossy green or blue marking, and the hindwings below having two transverse black lines crossing regularly or irregularly a whitish, grey or yellow ground often with a row of black dots between.

Dr K. G. Blair exhibited a selection of galled twigs of sawfly together with some of the insects that were reared from them. These included:—

1. *Sesia* (*Synanthedon*) *flaviventris*, Stdgr. (Lep.). Gall a conspicuous oval swelling usually in second year twigs; gall merges gradually into the twig at both ends, the feeding gallery of the larva above the gall in which it partially encircles the stem. Twig usually dies off above the gall. Parasites: *Macrocentrus marginator*, Nees (Braconidae). Forms an elongate semitransparent cocoon within the burrow; *Ephialtes tuberculatus*, Fourc. (Ich. Pimplinae). Pupa naked in burrow.

2. *Saperda populnea*, L. (Col.). Gall very similar to last, but central gallery shorter and somewhat compressed. Parasites: *Ephialtes tuberculatus*, Fourc. (Ichneumonidae); *Digonochaeta setipennis*, Mg. (Dipt. Tachinidae); *Atropidomyia irrorata*, Mg. (Dipt. Tachinidae).

3. *Melanagromyza simplicoides* Hend. (Dipt. Agromyzidae). Gall a swelling less marked than above, often more or less elongate and composed of several confluent galls. The swelling is on one side of twig only, the proliferated tissue being between bark and wood and not affecting the medullary cavity. The white puparia of the flies lie close to the exit holes, just beneath the bark.

N.B.—This is an addition to the British list. The galls were collected by Mr Eagles at the Field Meeting at Effingham on 4th May and

the flies subsequently reared by him. I am indebted to my colleague, Dr F. W. Edwards, F.R.S., for the determination. This gall appears to have been identified with *M. schineri*, Gir. (Connold, "Plant Galls of Great Britain," No. 316), a closely allied species forming similar galls on Aspen twigs; in fact there is some doubt whether the two species are distinct.

4. *Rhabdophaga salicis*, Schrank. (Diptera, Cecidomyiidae). Galls are subspherical swellings usually on first year twigs, often multilocular and several more or less confluent (Connold, *loc. cit.*, No. 200). Parasites: *Torymus tipulariarum*, Zett. (Chalcididae); *Seladerma salicis*, Nees; *Encyrtus* sp.; *Platygaster* sp. (Proctotrupidae). The distended larval skin of the Cecid. filled with cocoons of the last, was referred to by Westwood ("Intro.," ii, p. 170, fig. 78 (14)).

Among other species galling willow stems, though not exhibited, are: *Cryptorhynchus lupathi*, L. (Col., Curculionidae); *Rhabdophaga saliciperda*, Dufour (Dipt., Cecidomyiidae).

Dr Blair also recorded that from a larva of *Acronicta psi*, L., found fully grown at Wimbledon on 25th June, a moth emerged on 28th July. Two further larvae were found a day or two after the first, but each produced after spinning its cocoon a single Tachinid puparium. From these an imago of *Compsilura concinnata*, Mg., appeared on 29th July. Apparently a curious case of both host and parasite producing at least a partial second brood.

Mr R. Attwood exhibited a selection of the insects taken on 8.viii.40 at the Byfleet Field Meeting and read the following note on a recent swarm of Ants at Sydenham: On the 31st July 1940 there was a sudden swarm of ants, probably *Lasius niger*, L., at Sydenham. They were first noticed in one or two gardens about 5 o'clock in the afternoon and were massed in small circular patches about four inches in diameter. About 6 o'clock they commenced flying, and according to all accounts both large and small ants were flying in thousands, so much so that people had to go indoors. The flight continued until about 7.30 o'clock, but was then nearly over. I got home about 8 o'clock and went out to get some specimens. By that time the ants were all de-alated, and although there were hundreds of these wingless ants I had great difficulty in finding the two winged specimens shown. The main flight and de-alation of the insects had taken place in the space of about one-and-a-half hours. There was a similar swarming of ants reported a week earlier at Croydon.

Reports of several Field Meetings were presented and read.

A discussion then took place on the "Liberation of Insects." The discussion was opened by Mr F. D. Coote, who quoted remarks made in the "Entomologist" by C. A. Paton and the Rev. Geo. Wheeler. Mr C. N. Hawkins then spoke against liberation, on biological grounds, as upsetting the genetics of local races and gave *L. coridon* as an example. Mr S. Wakely disagreed and stated that he had personally liberated *Melitaea cinxia* at Lewes and a local plume, which he had

received from Mr Bainbrigge Fletcher, in Surrey. Captain Jackson considered that the bad effects were being much exaggerated and that in most cases large species only would be introduced, which would provide pleasure for a great number of people. This brought forward comments from Dr Cockayne, who said that the planting of *Gonepteryx cleopatra* in Ireland and the "Copper" in England were being carefully recorded and no harm would arise from the transfer of *M. athalia* from Blean Woods to Hadleigh Woods. The transfer of *M. aurinia* from one colony to another would ruin all scientific data relative to local races. In his opinion Mr Wakely should have given notice in the entomological journals. Mr Wakely replied that, had he done as Dr Cockayne suggested, all the larvae might have been taken in one season as the food plant was very local and the individual plants few in number. Dr Cockayne remarked on the different facies occurring in different localities. Mr Burton was of the opinion that no damage would result from the interference with colonies of *M. aurinia*. Dr Cockayne then instanced the introduction of *Nymphalis (Vanessa) antiopa* by a London firm and said that apart from spoiling all records the procedure served no useful purpose as the species cannot establish itself in this country. After this the remarks became more general and the majority of those present gave their views. The discussion ended with opinion about equally divided.—H. G. D.

22nd AUGUST 1940.

Dr E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S., President, in the Chair.

Mr J. Deal exhibited two specimens, ♂ and ♀, of *Actias selene*, L., bred from ova given him by Mr D. H. Sterling, laid 25th May 1939. They emerged September 1939. One ♀ emerged in June 1940, and a ♂ and a ♀ emerged on 1st August. Successful pairing was made, and eggs deposited on 3rd August started to hatch 17th August. He said he had one more cocoon of the last brood still in hand.

Dr G. V. Bull exhibited a number of Hymenopterous and Dipterous parasites reared from various hosts as follows. The names and notes have been kindly supplied by Dr K. G. Blair. Hymenoptera:—Ichneumonidae—*Listrodromus nycthemerus*, Grav. (Sandhurst) from *L. argiolus*, L., the usual and only parasite listed by Morley and Rait-Smith, 1933. *Henicospilus merdarius*, Gr., from Dungeness, either from *D. albimacula*, Bork., or *D. carpophaga*, Bork., if from the former it is the only one listed by M. & R.-S., 1933. Braconidae—*Meteorus melanostictus*, Capron, from *T. obeliscata*, Hb., from the New Forest. *Macrocentrus abdominalis*, Fb., from *N. rivalis*, Scop., Sandhurst. *Apanteles sybillarum*, Wilk. (1936), from *L. camilla*, L., from Beckley, formerly confused with *A. vanessae*, but recently described as a distinct species. *A. cajeae*, Behé, from *A. cajea*, L., Cornwall, common on this host and *A. villica*, L. *A. spurius*, Wesm., from *D. caeruleocephala*, L., from Sandhurst, recorded from this host in 1916 by G. Lyle as *A. insidens*,

Ratz. *A. fraternus*, Reinh., from *A. ochrearia*, Rossi, from Dungeness, a well known parasite from this host and the only one listed by M. & R.-S. *Microgaster connexus*, Nees, from *P. similis*, Fuessli, a well-known parasite from this host. Chalcididae—*Pteromalus puparum*, L., from *N. io*, L., both sexes from the pupa of many species. *Eulophus* sp., from *C. pigra*, Hufn., Benenden. *Copidosoma* sp. (probably *cidaria*, Thoms), from *T. obeliscata*, Fb. Tunbridge Wells, common from this host. Diptera:—Tachinidae—*Carcelia comata*, Rond., from *A. caia*, L. Kent, one of many Tachinids from this host. *Actia bicolor*, Macq., from *L. quercus*, L., a common parasite on this species.

Mr T. Eagles exhibited young larvae of *Clostera curtula*, L., obtained during the Bookham Field Meeting; Diptera of the genus *Therioptectes* from the same locality; and adult parasites, *Trichogramma evanescens*, Ww., which emerged from the ovum of *Smerinthus populi*, L., exhibited at the last meeting.

Mr F. D. Coote, on behalf of Mr Hy. J. Turner, exhibited the remarkable and beautiful Saturniid, *Graellsia isabellae*, Graëlls, and communicated the following note. (See figures in Seitz, "Pal. Bombyces," ii, plt. 33, and in Spuler, "Schm. Eur.," i, plt. 21): "This moth is indigenous to the elevated pine woods of Central Spain around Madrid, and although known from the year 1849 has been found only in the one area, more or less abundant at Bronchales, where Dr Chapman met with it in 1902, until in 1922 M. Chas. Oberthür announced its discovery in the Hautes-Alpes of S.E. France. In the "Ann. Soc. Ent. France," 1850, Graëlls described and figured the larva, cocoon, chrysalis, and female imago. Many times since this has the species been figured. The larva feeds on the lower branches of *Pinus sylvestris*, L. The race discovered in S.E. France (Argentière, etc.) was named *galliaegloria* by Oberthür in "L'Amateur de Papillons," vol. i, 238, and differs from the Spanish race by its melanic tendency, the venation being of a brownish black instead of a vinous red as in the Spanish race."

On his own behalf Mr Coote exhibited ova and larvae of *Acasis* (*Lobophora*) *viretata*, Hb., and ova and larvae of *Lycaenopsis argiolus*, L.

Mr C. N. Hawkins exhibited three bred series of *Malacosoma neustria*, L., consisting of (1) 11 males and 9 females from ova found during the Society's Field Meeting at Oxshott, 6.iv.40; (2) 5 males and 4 females bred from wild larvae collected at Herne Bay, Kent, in 1924; and (3) 4 males and 6 females bred from wild larvae collected at Bury St Edmunds, Suffolk, in 1919. It is possible that (2) and (3) came from a single brood in each case but there is no proof of that. In (1) the males are ochreous buff and the females brownish buff with darker median bands on fore and hindwings; both sexes have notably dark cross lines on the forewings. In (2) both sexes are red-brown with pale cross lines, and very slight traces (in one or two specimens only) of darker median bands. In (3) two males are brown (not red-brown as in (2)) and two males are pale ochreous-buff. The females vary from a

rather bright red-brown to almost yellow, and the shape of the bands across the forewings varies considerably in width, in one case being almost divided in two just below the middle. The males and some of the females have dark cross lines on the forewings but these are much less strong than in series (1). Most have traces of a dark median band on the hind wing also. Side by side the three series look very distinct but there is not enough material to know whether they are really typical of the respective localities.

Mr S. Wakely read a detailed paper on his recent captures and breeding of Micro-lepidoptera and exhibited the various species mentioned. (See *Trans.*)

26th OCTOBER 1940.

Mr F. STANLEY SMITH in the Chair.

Mr Denzil Fennell, Martyr Worthy Place, Winchester, Hants, and Mr Edward Pelham-Clinton, c/o the above, were announced as having been elected members.

Mr E. E. Syme exhibited the Hemipteron *Ploiaria culiciformis*, D. G., and the Neuropteran *Chrysopa carnea*, Steph., and read notes on the life histories.

Mr S. Wakely exhibited bred specimens of *Gnophos (Pseudopanthera) obfuscaria*, Hb., from Blair Athol; *Crambus falsellus*, Schiff., bred from larvae found feeding on wall moss at Grange-over-Sands; and a series of *Gracillaria phasianipennella*, Hb., bred from Westmorland larvae.

Mr T. R. Eagles exhibited examples of the fruit of *Pyrus japonica*, Thunb.

A letter was read from Mr H. E. Barron, who was one of the oldest members of the Society, having joined in 1887.

The question of future meetings was put to the members present, and it was the general opinion that in view of the present circumstances it would be advisable to hold meetings on Saturday afternoons, the final arrangements being left to the Council.

9th NOVEMBER 1940.

Mr F. STANLEY SMITH in the Chair.

Miss B. M. Pearson, 20 Merridale Lane, Wolverhampton, Staffs., was admitted a member.

Mr S. Wakely exhibited a series of *Nothopteryx (Trichopteryx) polycommata*, Schiff., from the Headley Lane district of Surrey.

Mr S. R. Ashby exhibited seed pods of *Wistaria* from a plant he had had for the past 20 years, but which had not previously fruited.

Mr E. E. Syme exhibited cocoons on bark of the Neuropteran *Conwentzia (Uniopteryx) psociformis*, Curt.

Mr Eagles exhibited examples of *Zanclognatha tarsipennalis*, Tr., and *Pyralis glaucinalis*, L., from Enfield, and a living example of *Polia ornithopus*, Rott. (*rhizolitha*, Fb.).

Lantern slides were shown by Messrs W. J. Finnigan and E. E. Syms.

Mr Howard exhibited an asymmetrically marked aberration of *Mimas tiliae*, L., taken wild in Hampstead, and a short series of *Dianthoecia irregularis*, Hufn., bred from larvae gathered last August near Mildenhall.

Mr T. R. Eagles exhibited a seed head of *Siler trilobum*, Crantz.

Mr S. Wakely exhibited, on behalf of Dr G. S. Robertson, the following aberrations taken at Storrington, Sussex:—A fine example of *Xanthorhoe fluctuata*, L., with central band complete to dorsum; a dark-banded form of *Hydriomena bilineata*, L., the middle area of the band being lighter in shade than the ground colour; a specimen of *Alucita pentadactyla*, L., showing black scales forming a black dot below the lower cleft. A fine specimen of the local Tortrix *Endothenia anti-quana*, Hübn., was also included.

Mr C. N. Hawkins exhibited two melanic (? ab. *perfuscata*, Prout) female specimens of the Geometrid moth *Ennomos quercinaria*, Hufn., also three more or less normal specimens from the same brood. All were bred last month and as their history is rather interesting he read the following note:—In 1934 Mr Frank Lees, then of Little Aston, near Birmingham, paired a bred normal ♀ from the Cotswolds with a wild normal ♂ from Little Aston. This pairing gave rise in 1935 to an all-normal brood of ♂♂ and ♀♀ (by “normal” in this note I mean “non-melanic” and do not take account of varying degrees of dark shading in outer-marginal areas, etc., which seem to be controlled independently of melanism). These 1935 males and females, pairing indiscriminately in the cage, gave in 1936 a number of normal specimens and a few melanics. Melanic × melanic gave in 1937 all melanics but they were few and weakly and the pure melanic strain died out. Another melanic ♀, paired with a normal coloured but well-shaded ♂ of the same brood, gave in 1937 50% melanics and 50% well-shaded normals, so it is evident that, by good fortune, the ♂ parent of this brood must have been heterozygous for melanism, and, of course, the 50% well-shaded normal members of the brood were also heterozygous for melanism. At this stage, fearing the strain was becoming sickly, Mr Lees paired a ♀, one of the 50% well-shaded normals just mentioned, with a wild Sussex ♂ and sent the resulting ova to me. These ova, as was to be expected, yielded in 1938 an all-normal brood. A “chance shot” pairing from amongst these, which must, as events proved, have been heterozygote × normal, gave in 1939 another all-normal brood. At this stage a still more fortunate “chance shot” pairing between members of this brood, which must, in fact, have been between ♂ and ♀ heterozygotes (for melanism) has given this year (1940) the two melanic ♀♀ shown and 12 normals (3 ♀♀, 9 ♂♂) actually bred, also

2 ♂ and 4 ♀ dead pupae, of which certainly 1 ♀ and perhaps 1 other ♀ and 1 ♂ appeared to be melanic. Both in 1938 and 1939 at least one of the parents of my broods was a strongly shaded specimen and in 1939, in fact, both parents were as well marked as I could select from the brood. It will be noted also that Mr Lees' pairing in 1936 which gave rise to the present strain was between a melanic and a well-shaded specimen. There is, therefore, a suggestion that the latter form is the heterozygote for melanism, but on the other hand there is evidence that the shading is inherited independently. Both the melanic ♀ ♀ shown have been placed in association with well-shaded ♂ ♂ of the same brood but were not actually seen paired. However, both have laid good batches of ova and one batch at least looks fertile, so I hope to be able to throw more light on the question of the heterozygotes in due course.

14th DECEMBER 1940.

Mr F. STANLEY SMITH in the Chair.

Mr J. A. Stephens presented the Society with the four volumes of Tutt's "British Noctuae and their Varieties."

Mr S. N. A. Jacobs exhibited two species of the Micro-Lepidopterous genus, *Coleophora*, Hb. (*Eupista*, Hb.), namely, *C. lineolea*, Haw. (*crocogrammos*, Zell.) and *C. apicella*, Stain. and their larval cases, concerning which species Meyrick has made such inexplicable blunders in his "Revised Handbook."

Subsequently Mr Hy. J. Turner submitted the following statement of the facts relating to the two species exhibited:—1. *C. lineolea*, Haw., of which the larva feeds on *Ballota nigra*, L., *Stachys sylvatica*, L., etc., making a case of fragments of the hairy or woolly leaves upon the plant it attacks. It was first described (badly) by Haworth in his *Lep. Brit.*, p. 534, in 1828. Stainton gave a full life-history in vol. iv of his *Nat. Hist. of the Tin.*, with a plate of excellent figures of imago, larva, case, and food plant. In the meantime Zeller had met with the species in Germany and not knowing that it had already been described, named it *crocogrammos* (not "ma" as Meyrick has it). This Stainton pointed out to Zeller and the name of course had to be dropped as a synonym. Stainton was quite clear in his recognition of Haworth's species as he examined Haworth's series and found it was the same species which he bred from the Lewisham lanes, near his house at Lewisham, on *Ballota nigra*, from whence many years ago I, too, bred the species. I also examined Haworth's *lineolea* and it was undoubtedly the species which, like Stainton, I had bred. 2. *C. apicella*, Stain. This species was described in the "Entomologists' Annual," in 1858, p. 93, by Stainton. He said, "By the peculiarly sharp apex of the anterior wings, and by the pale colour of the wings and dark apex, it may be distinguished from all the other species." Subsequently its life history was learned, its larvae fed on the seeds of *Stellaria graminea*, L., and made a thin cylindrical case, in no way comparable with that of *C. lineolea*. I

have never met with this species. 3. In the first edition of Meyrick's "Handbook" (1895), p. 655, these facts and nomenclature were accepted. But in the "Revised Handbook" (1928) the names were hopelessly mixed: (1) The name *lineolea*, Haw., was applied to the *apicella*, Stain., which latter name was treated as a synonym; that is to say to the species with a cylindrical case; (2) The name *crocogramma* (α should be *os*), Zeller, was applied to the *lineolea*, Stain. (not Haw.); that is to the species with a broad case of leaf fragments of *Ballota nigra*, *Stachys sylvatica*, etc. Surely it is not too strong expression if this be called a hopeless muddle. No explanation of this compound mixture of names has ever been published to my knowledge.

Mr Hy. J. Turner exhibited the exotic genus *Parthenos*, Hb., by forms of the two species, *P. sylvia*, Cr., and *P. tigrina*, Voll. The former was distributed over most of the exotic areas of the Indo-Malay Region, the latter was more localized in New Guinea. *P. tigrina*, Voll., r. *aspila*, Honr. N. Guinea. *P. sylvia*, r. *gambrisius*, Fab. Pale green, slight bluish-green. r. *virens*, Mre. N. Kanara. Broad black markings. Greenish-golden colour. r. *salentia*, Hpffr. Celebes. Large. Pale grey-green patches. r. *apicalis*, Mre. Dry. Burmah, Assam, Bengal. r. *ellima*, Fruh. Transparent spots rather large. r. *philippensis*, Fruh. Broad black margin, h.w. pale brown-yellow basal area. r. *keyanus*, Stdgr. (?). Key Isles. r. *sulana*, Fruh. Black markings, iridescent blue lustre. r. *butlerinus*, Fruh. Pale form. Palawan. Pale blue stripes on h.w. r. *coupei*, Ribbe. Broad dirty white spots on f.w. Neu Mecklenburg. r. *roepstorfi*, Mre. Below faded grey-green. N. India. r. *sylla*, Don. Small. S. China, etc.

Mr J. A. Stephens exhibited the following species of Coleoptera: *Stilicinus fragilis*, Gr. (*sulcicollis*, Eur. Cat.), taken 12.xii.40 out of a straw heap at Chatham. *Pogonochaerus hispidus*, L., taken in October 1940 by beating old ivy, rare, not supposed to be found in the London area, and *Xylophilus* (*Hylophilus*) *populneus*, Pz., taken at the same time and place as *S. fragilis*. From the same heap of straw, *Acidota crenata*, Fb., on 4.xii.40. All the above were taken in the Chatham district.

Mr T. R. Eagles exhibited a plant of *Epimedium alpinum*, L., an ornamental hardy perennial from Central Europe, naturalized in places in this country; also the fruits of *Cydonia maulei*, one of the quince bushes introduced from Japan with beautiful golden-yellow fruit, but very bitter to the taste.

Mr E. E. Syms exhibited living examples of the "Cluster Fly," *Pollenia rudis*, Fb., parasitic on some species of earthworm.

Mr S. R. Ashby exhibited a large number of insects collected in the New Forest to illustrate the subsequent discussion on the New Forest. Lepidoptera—*Limenitis camilla*, L., *Catocala sponsa*, L., bred from a New Forest larva. Hemiptera—*Eusarcoris aeneus*, Scop., *Pygolampis bidentata*, Goeze, taken by the late William West, 22.v.1914; this being the second British specimen. *Cicadetta montana*, Scop. Coleoptera—*Carabus nitens*, L., *C. arvensis*, Hb., *Elaphrus uliginosus*, F., *Orecto-*

chilus villosus, Mul., *Staphylinus latebricola*, Gr., *S. erythropterus*, L., *S. parumontosus*, Stein., *Paederus caligatus*, Er., *Halysia sedecemguttata*, L., *Platynaspis luteorubra*, Gz., *Triplax aenea*, Sl., *Colydium elongatum*, F., *Thymalus limbatus*, F., *Serica brunnea*, L., *Phyllopertha horticola*, F., a black var.; *Anomala aenea*, D. G., and a dark green var.; *Anthaxia nitidula*, L., *Agrilus viridis*, L., *Trachys troglodytes*, Sr., *Dirrhugus pygmaeus*, F., *Elater cinnabarinus*, Es., *E. sanguinolentus*, Sk., and its yellow var., *paleatus*, Ca.; *E. pomonae*, S., *E. elongatulus*, F., *Athous villosus*, Fc., *A. vittatus*, F., *Sericus brunneus*, L., *Corymbites nigricornis*, Pz., *C. bipustulatus*, L., and its red var. *semiflavus*, Kr.; *Tillus elongatus*, L., *Xyletinus ater*, Cz., *Anitys rubens*, Hf., *Prionus coriarius*, L., *Asemum striatum*, L., and its var., *agreste*, F.; *Callidium violaceum*, L., and a bronze var.; *Phymatodes testaceus*, L., and very dark vars.; *Leptura sexguttata*, L., *L. scutellata*, F., *L. quadrifasciata*, L., *L. nigra*, L., *Grammoptera variegata*, Gm., *G. ustulatus*, Sl., *Pogonochaerus hispidulus*, Pi., *Mesosa nebulosa*, F., *Donacia crassipes*, F., *D. versicolore*, Bm., *Chrysomela varians*, Sl., both blue and bronze forms; *Cassida fastuosa*, Sl., and its yellow var., *flava*, Don., *Platydemus violaceum*, F., *Phloeotrya rufipes*, Gy., *Asclera sanguinicollis*, F., *Tropideres sepicola*, F., taken by the late William West, vii.1904, being the third British specimen, *Orchestes iota*, F., *Xyleborus dispar*, F.

The Chairman read a note received from Mr Hy. J. R. Twigg recording the occurrence of *Polygonia c-album* at Sydenham.

A considerable discussion, opened by the Chairman, then took place on "Memories of the New Forest."

Mr Coote then read extracts from a series of Entomological Notes made by an entomologist of some 50 to 60 years ago.

11th JANUARY 1941.

ANNUAL GENERAL MEETING.

Mr C. N. HAWKINS in the Chair.

The Minutes of the last Annual General Meeting, held 13th January 1940, were read and confirmed.

The Treasurer's Report and Balance Sheet was read and adopted; unexpectedly a small credit balance was announced.

The Council's Report was read and passed.

The following List of Officers and Council for the ensuing twelve months was read, and, there being no alternative proposals, those mentioned were declared elected:—*President*—F. D. Coote, F.R.E.S. *Vice-Presidents*—E. A. Cockayne, D.M., F.R.C.P., F.R.E.S.; and S. Wakely. *Treasurer*—T. R. Eagles. *Secretaries*—F. Stanley-Smith, F.R.E.S. (Corresponding); H. G. Denvil (Minuting). *Editor of Proceedings*—Hy. J. Turner, F.R.E.S., F.R.H.S. *Curator*—S. R. Ashby, F.R.E.S. *Librarian*—E. E. Syms, F.R.E.S. *Council*—C. N. Hawkins,

F.R.E.S.; S. N. A. Jacobs; G. V. Bull, B.A., M.B.; R. J. Burton, L.D.S., R.C.S. (Eng.); R. W. Attwood; A. Bliss; F. J. Coulson; S. P. Doudney; W. J. Finnigan; and Baron de Worms, M.A., Ph.D., F.R.E.S., etc.

In the unavoidable absence of the President there was no Presidential Address, and the New President took the chair.

Votes of thanks were then passed to the retiring President, the Officers and Council, and to the Auditors. A special vote was passed to the Secretary, Mr S. N. A. Jacobs, who was retiring after nine years in the office.

ORDINARY MEETING.

Mr F. D. COOTE, President, in the Chair.

A collection of separates on our gall-causing insects was presented by the author, Mr Niblett.

Mr Hawkins exhibited living larvae of the Chafer, *Amphimallus solstitialis*, L. (Col.), found under a lawn at Wimbledon in December 1940.

Dr G. V. Bull communicated the following notes on the season in his own locality, Sandhurst, Kent.

COLLECTING IN 1940.

Most of my collecting in 1940 was within a radius of 6 miles and the greater part of that within $1\frac{1}{2}$ miles. Visits to popular localities in Kent were few and far between.

So far as it was possible to judge from strictly local searching before dark, the ordinary visitors to sallow catkins were in their usual numbers, but search of low growing herbage and sapling birches revealed an absence of larvae.

A visit to the Long Walk in Regent's Park, 11th April, showed a number of freshly-emerged *Lycia hirtaria*, Clrek., *Euchloë cardamines*, L., 22nd April, and *Lycaenopsis argiolus*, 27th April, were unusually abundant, the former being on the wing up till 11th June. Nests of larvae of *Nymphalis io*, L., were more plentiful than those of *Aglais urticae*, L., but all were badly stung, three different parasites being bred from *A. urticae*. In the autumn, except on one day, *A. urticae* was more numerous than *N. io*, which was never seen on flowers in my garden. Owing to absence from home at the end of May I did not begin my garden round of sugar, some 24-30 posts, till early June, and the evenings were so cold for the first fortnight that insects only came in very small numbers till 15th June, when seven species were noted. After that date many of the common species were very abundant, *Leucania comma*, L., on 16th June and *Xylophasia monoglypha*, L., on 18th June. This latter appeared plentifully for some weeks, and all were of the pale form; no dark brown specimens, which are not usually uncommon, were seen, and no black, which turn up occasionally. *Triphaena prænuba*, L., was also very common up to 24th September. *Aplecta*

nebulosa, Hufn., *Noctua festiva*, Schiff., and *N. triangulum*, Hufn., were not seen at all. A few Geometers, which I have not seen at sugar before, appeared, among them *Sterrhia emarginata*, L., *S. dimidiata*, Hufn., *S. inornata*, Haw., the last new to my list. Later *Catocala nupta*, L., *Amphipyra pyramidea*, L., and *Maestra protea*, Bork., were more plentiful than I have ever seen them. Two species new to the garden list, now 305, were *Oligia literosa*, Haw., 19th August, and *Plastenis subtusa*, Fb., 10th August. I was working at Ashford in early September and paid a hurried visit to Ham Street on the afternoon of 5th September. *A. urticae* was very abundant and one *Vanessa cardui*, L., was seen; very few larvae were beaten in the half-hour I had to spare. Most of the ordinary autumn insects came to sugar or ivy blossom but *Xanthia aurago*, Fb., was not seen. The following late emergences (? second and third broods) were noted:—*Erynnis tages*, L., 29th and 31st July; *Oligia strigilis*, Clrck., 17th August; *Agrotis exclamationis*, L., 4th September; *Xylophasia lithoxylea*, Fb., 4th September, and a week later at Buxted (G. W. Wynn); *Triphaena fimbria*, L., 12th September; *Agrotis segetum*, Schiff., 26th September; *Pieris rapae*, L., 7th October; *P. brassicae*, L., 26th October, and full-fed larvae all parasitized, 27th October and 26th November. Sugaring ended on 14th November, when one *Xylina ornithopus*, Rott., was the only insect seen. Of immigrants the *Colias* were not seen; *V. cardui* was seen occasionally, not more than two at one time. Work at New Romney enabled me to visit Dungeness, where a fair number of *Heliothis peltigera*, Schiff., larvae were taken. On another occasion larvae of *Lasiocampa trifolii*, Esp., were swarming.

RECORDS AND FULL DESCRIPTIONS OF VARIETIES AND ABERRATIONS,

intended for the Annual Exhibition of the South London Entomological Society which, owing to the war, could not be held.

Compiled by S. G. CASTLE RUSSELL and HY. J. TURNER for publication in the *Entomologist's Record* and for the *Proceedings* of the Society.

Mr J. L. Atkinson.—*Nymphalis antiopa*, L. A specimen taken by the exhibitor sunning on a fence in his garden at Tankerville, Kent, at 6.30 p.m. on the 8th November 1940.

Mr F. W. Andrews.—*Polygonia c-album*, L. A suffused form with pale spots of submarginal area obsolete. Mid costal spot rather broad, otherwise forewings have only two points of aberration—(a) suffused marginal area, (b) only one black spot in region of inner margin: this is the central one and is larger than normal. Hindwings almost entirely suffused with dark scales having two central darker blotches only, one above the other of which the upper one is larger than normal. Under side is of the dark type with metallic green submarginal spots heavily marked on upper and lower wings. Taken at Brockenhurst, 22nd July 1940. Sex dubious but probably ♂. Also an extreme melanic form nearly approaching Frohawk's fig. 19 on Pl. 21. Taken in the Oxford district, 8th July 1940, by Mr Andrews, Junr. *Nymphalis io*, L. An example with the ocelli obsolete on hindwings: they appear as pale grey circular patches with two small brown spots in the centre. There are no signs of blue scales. Somewhat similar to Frohawk's fig. 16 on Pl. 24. *Limenitis camilla*, L. An example of ab. *semi-nigrina* taken in the Forest, July 1940. *Colias croceus*, Frery. A remarkable specimen of true *hyale* primrose colour taken at Folkestone.

Mr E. S. A. Baynes.—*Apamea secalis*, L. A gynandromorph taken at sugar at the Lizard, 10th August 1939, left side being ♂ and right side ♀. *Diarsia festiva*, Hb. A somatic mosaic: the head collar and thorax are beautifully divided with the two colours. Antennae, frenulum and (so far as can be seen) genitalia are ♀ on both sides. Taken at Aviemore, 24th July 1909. *Procus (Miana) versicolor*, Bdv. An unrecognized form identified by Mr Tams and taken with two other similar specimens in North Wales, June 1917. In this form the ground colour is pale brownish, the central band darker with a cherry reddish tinge, while the stigmata being of the same tint as the ground colour, stand out distinctly from the central band. *Notodonta camolina*, L. Bred from a larva taken in Anglesey, September 1907. The general colour of the upper wing on the left side is a typical reddish-brown, but on the right side the colour is reduced to a pale buff with traces of reddish-brown at the base. The reduction in colour on the right side extends to the hindwings and is presumably due to some fault in the pigment.

All the above insects are figured in the *Entomologist's Record* for 1940, vol. lii.

Dr G. V. Bull.—*Pieris rapae*, L. Females with the spots on the forewings nearly united by black scaling. *Pieris napi*, L. Semitransparent with veins showing through on upper side. *Aglais urticae*, L. A dark suffused example; one with the spots on the forewings absent; a *polaris*, Stdgr., the two large costal spots united; another with the blue lunules on the hindwings elongated; and one in which the spots on the forewings were absent with the hindwing dark suffused. *Vanessa io*, L., in which the ground colour is of a curious brown coloration. *Argynnis aglaia*, L., from Rannoch had a suffusion of black scales below. *Erebia aethiops*, Esp. (*blandina*, Fb.), with the outer half of the forewing very pale, possibly a scale defect. *Pararge megera*, L., with the central area of the forewings darker than usual. *Brenthis euphrosyne*, L. A fine suffused form of all four wings; another with the hindwings suffused while the forewings were devoid of nearly all the black markings; another heavily blotched; a straw-coloured form; and two examples with strongly marked forewings. *Brenthis selene*, Schiff., one with the central markings on the forewings absent with some radiation on the margins; and two examples dusted with black scales. *Maniola jurtina*, L., with xanthic, almost pure white areas on the forewings. *Maniola tithonus*, L. Three examples of the *addenda*, Tutt, form from Royston, Devon, and Ashford respectively. *Aphantopus hyperantus*, L., ab. *lanceolata*, Frohawk, and ab. *obsoleta*, Tutt. *Heodes phlaeas*, L., the straw-coloured ab. *schmidtii*, Gerh.; ab. *eleus*, Fb., the dark suffused form; ab. *caeruleo-puncta*, Stdgr.; and some partially obsolete forms, *Polyommatus icarus*, Rott., obsolete forms. *P. coridon*, Poda, ab. *bi-arcuata*, Tutt, and *P. bellargus*, Rott., ab. *digitata*, Tutt.

Mr A. A. W. Buckstone.—*Pieris brassicae*, L. Two males with a black spot on the disc of the forewings: bred from ova obtained from Ashstead in May 1940. *Pararge aegeria*, L. Series of dark examples of spring, summer and autumn broods: bred from I. of Wight ova. *Polyommatus icarus*, Rott., ab. *obsoleta*, Tutt, taken at Dorking, May 1940. *Aricia agestis*, Schiff. (*astrarche*, Bergs.); a short series form *alous*, Hb., taken at Fetcham, Surrey, 1940.

Mr S. G. Castle Russell.—*Argynnis selene*, L. An aberration with primary and secondary wings suffused with black, New Forest, July 1940. *Pieris brassicae*, L. Three ♀ examples of ab. *interjuncta*, Cabeau. Black spots on upper wings coalesced and forming a bar. *Plebejus argus*, L. A gynandromorph showing mixed male and female colouring: the right side wings are mostly male and the left side wings mostly female. Taken by the late E. C. Joy, New Forest, July 1940. *Lysandra coridon*, Poda. Examples of abs. *obsoleta*, *caeca*, *digitata*, and *anti-juncta*. A ♀ example of ab. *caeca* all wings being of ♀ colouring, but the body is conspicuously male: probably a gynandromorph.

Mr H. A. Leeds.—Captures near Wood Walton, Hunts, in 1940. *Satyrus galathea*, L., and *Coenonympha pamphilus*, L., under sides of faded and washed out appearance—ab. *transformis*, all wings. *Polyommatus icarus*, Rott. ♂ upper side ab. *pallidula-caeruleo*. ♂ under side ab. *post-discoelongata*; ♀ upper sides abs. *syngrapha-caeruleo*, *syngrapha-lavendula*, *syngrapha-transparentens*, *glabrata*, and *postcaeruleo-signata*. *Heodes (Lycena) phlaeas*. ♂ upper sides abs. *eleus*, Tutt, and *auroradiata*; ♂ under side ab. *costajuncta*; ♀ upper sides *auronitens*, Tutt, *anti-transiens*, *antijuncta*, *anti-discoelongata*, and *anti-centre-juncta*; ♀ under side ab. *confluentiae* (*semi-costajuncta-basijuncta*). *Pieris brassicae*, L. ♂ under side with hindwings peppered all over with black scales, ab. *post-metallica*. *Euchloë cardamines*, L. ♂ upper side ab. *flavesens*. Except where Tutt is added the terms are from the "Monograph of *Lysandra coridon*, Poda."

Rev. J. N. Marcon.—An example of the form called *polonus*, assumed to be a hybrid between *L. bellargus* and *L. coridon*, taken in Sussex, 15th June 1940. *Lysandra coridon*, Poda. ♂ upper side abs. *margo-transformis*, *viridescens*, *pulla*, *semi-livida*, *fowleri*; ♀ abs. *albescens* and *pulla*. Under sides of abs. *caeca-antijuncta*, etc. *Lysandra bellargus*, Rott. ♂ upper side of ab. *argentea*; ab. *radiata*, a ♀ with six extensive stripes on each forewing and short radiations on the hindwings on chalky-white ground. Lunules on all four wings white, giving the insect a striking appearance. Another somewhat similar ♀, the radiations being on forewings only and very thin. Hind wings normal, white lunules on all wings. *Polyommatus icarus*, Rott., a male example of ab. *radiata*. *Plebejus argus*, L. An under side ab. *glomerata*. *Coenonympha pamphilus* L. An homoeotic example: on the left under side hindwing is a large patch of forewing colouring almost filling veins 3 and 4. *Maniola jurtina*, L. A fine golden female. *Argynnis cydippe*, L. A ♀ heavily banded on fore and hindwings. All above were taken by exhibitor in Sussex.

Messrs W. E. Minnion and B. S. Goodban.—Insects bred or captured in 1940. (1) Series of *Saturnia pavonia*, L., bred from larvae taken at Robin Hood's Bay, N.E. Yorks. (2) Series of *Lasiocampa quercus*, L., var. *callunae*, Palm., bred from the same locality. (3) Series of *Biston betularia*, L., var. *carbonaria*, Jord. (*doubledayaria*, Mill.), bred from Banstead ova; the series included 3 typical and 1 intermediate assembled at Chalfont. (4) Series of *Arctia caja*, L., full fed in October and forced at the end of November. (5) Insects taken at Chiddingfold, 25th April 1940: 3 *Leptidia sinapis*, L.; 6 *Eulyte hastata*, L.; 3 *Numeria pulveraria*, L.; 1 *Anagoga nebulata*, Scop. (*obliterata*, Hufn.); 1 *Ectropis extersaria*, Hb. (*luridata*, Bork.); 3 *Cepphis advenaria*, Hb.; 1 *Synanthedon spheciiformis*, Schiff.; 6 *Pyrausta octomaculata*, Fb.; and 2 *Chesias legatella*, Schiff. (*spartiata*, Hrbst.) bred from larvae taken at the same time. (6) Insects taken at Ruislip during 1940: 10 *Lobophora halterata*, Hufn.; 3 *Boarmia roboraria*, Schiff.; 1 *Hipparchus papilionaria*, L.; 1 *Polyplocia*

flavicornis, L.; 1 *Zeuzera pyrina*, L.; 1 *Stauropus fagi*, L.; 12 *Endotricha flammecalis*, Schiff.; 1 *Boarmia lichenaria*, Hufn. (7) Insects taken at Chalfont Field Meeting, 1940: 1 *Stauropus fagi*, L.; 12 *Hydrelia testaceata*, Don. (*sylvata*, Schiff.); 8 *Discoloxia blomeri*, Curt.

Mr C. G. Priest.—A series of extreme blue forms of ♀ *Polyommatus icarus*, Rott., taken at Box Hill, 7th August 1940, summer brood. *Pieris brassicae*, L. Spring brood, bred in May 1940, all with exceptionally deep black markings. *Endromis versicolora*, L., bred in March 1940, and a ♀ bred 19th October 1940, but somewhat ill developed. *Biston betularia*, L., a fully black form, ab. *carbonaria*, Jord., bred May 1940. *Heemerophila abruptaria*, Thbg., ab. *brunnecata*, Tutt, captured in Holland Park, May 1940. *Acronicta aceris*, L., bred June 1940.

Mr A. E. Stafford.—*Lysandra coridon*, Poda. A fine male *radiata* on a white ground with heavy black radiations: the upper side is ab. *ultra fowleri*. A similar form of ♀ ab. *radiata* more extreme than the above on a cream ground with intense black radiations. Three *antico-caeca* males, one with white forewings and grey hindwings. A series of ab. *obsoleta* forms including *caeca* and *post-caeca*: all males except one ♀ *post-caeca*. Upper sides abs. *pulla*, *fowleri*, and a gynandromorph with left hindwing three-fourths blue, the other wings brown. All above insects were taken by the exhibitor in Sussex. *Plebejus argus*, L. (*aegon*, Schiff.). A series of female forms banded or margined with blue on the upper sides. A series of twenty-one intersexes, some almost halved brown and blue, and one splashed with blue over all wings. Several examples of under side abs. including *costa-juncta*, *basiuncta*, and a ♀ ab. *striata*. All Surrey. *Polyommatus icarus*, Rott. A male upper-side with forewings of normal colour, hindwings opalescent: a series of females including extreme brown forms to extreme blue forms (*supra-caerulea*), a banded form and a specimen of the rare ab. *rufina*, Obthr. *Lycaenopsis (Cupido) argiolus*, L. A male underside ab. *antico-radiata*. All Surrey.

Mr G. H. Stovin.—A series of the hybrid *Laotioë (Amorpha) populi*, L. ♂ *Smerinthus ocellatus*, L., ♀ *rothschildi*, Stndf. *Abraxas grossulariata*, L. Striking aberrations of (1) *nigrosarsata*, Rayn., in varying degrees of black pigmentation; (2) *inframaculata*, Raynr.; (3) *aberdoniensis*, including specimens with almost completely black forewings; (4) *hazeleighensis*, Raynr., and (5) sundry asymmetrically marked forms.

Mr K. W. Self.—*Maniola tithonus*, L. A white ♀, ab. *minckii*, New Forest, 1940. *Maniola jurtina*, L. A ♀ with four well defined spots on each forewing, a very rare form. Another with bleached hindwings. *Coenonympha tullia*, Müll. An example of ab. *lanceolata*, Westmorland, 1935. *Argynnis paphia*, L. A ♂ with confluent spots on hindwings, New Forest. *Coenonympha pamphilus*, L. A white example, ab. *pal-lida*, New Forest. *Aglaia urticae*, L. An example with melanic hind-

wings, South Hants, 1940. *Aricia agestis*, Schiff. An *obsoleta* under side, Westmorland. *Lysandra coridon*, Poda. Four male examples of ab. *cinnameus*, and a female of whitish ground colour. Also forms of *obsoleta*, South Hants, 1940. *Heodes phlaeas*, L. A male example of ab. *alba* and another of ab. *schmidtii* and other forms including abs. *radiata*, *eleus*, etc. *Strymon w-album*, Knoch. An under side form in which the white line on the right lower wing is duplicated. *Polygonia c-album*, L. An example with melanic hindwings, South Hants, 1940.

Mr Hy. J. Turner had prepared a further selection of species of Heterocera from Manchuria, exhibiting the Palaearctic nature of the fauna, just as did the two sets of Rhopalocera previously received from that area of Eastern Asia. Many of the species received are non-British, but belong to the Fauna of Western Europe. *Gastropacha quercifolia*, L.—A ♂ of a bright reddish-brown with costa of hindwing having a wide orange streak. The transverse markings are practically quite absent on the hindwing, those on the forewings are narrow and not very clear, ab. *ccrridifolia*, Fldr. *Theophila mandarina*, Mre.—A ♂ of a species closely allied to the well known *Bombyx mori*, L., but of an olive-brown ground colour. Shape very similar to *B. mori*: falcate forewings. *Dendrolimus undans*, Walk.—An East Indian species, which has a few forms in the Palaearctic Region. ♂ forewing light reddish-ochreous with basal and marginal areas and the hindwings dark brown. Markings very irregular: the ♀ is much larger, dull greyish-brown. This Amur form is known as f. *excelsa*, Stgr. *Callambulyx tatarinovi*, Brm. & Gry.—The only Sphingid sent me: a very beautiful insect standing close to *Mimas tiliae*, L. Seitz's figure does not do justice to the beauty of the green form or of the brown form *eversmanni*, Evers, with its beautiful shades of delicate green. *Rhyaroides amurensis*, Brem.—A ♂ of this purely E. Asian species of Arctiid in which the usual sparse marking on the bright yellow forewing was less than that of the figure in Seitz, there being no trace of the three discoidal spots. *Arctia caja*, L.—A ♂ example in which the usual two elongate central blotches on the costa were completely united into one large feature, which was united to the usual blotch in the centre of the inner margin by a very small extension. This form occurs in this country occasionally. *Stilpnotia salicis*, L.—Two specimens of the East Asian form *candida*, Stgr., a glossy pure white form and more thickly scaled than the European specimens. *Lymantria dispar*, L.—A very dark brown ♂, darker and smaller than r. *japonica*, Motsch., and probably to be classed as *fumida*, Btlr., a smaller and darker form. *Hyphorma minax*, Walk.—Two examples of a Lymacodid described by Walker from N. China, and according to Seitz not since reported from that area, although occurring in India. The marking is quite distinct, the two transverse bands form an inverted Λ starting from near the apex of the forewing. Abundance of reddish-golden-brown hair on body.

Ennomos autumnaria, Wrbng.—A ♂ like British examples. *Abraxas suspecta*, Warr.—A ♂: a smaller and more heavily marked species than our *A. sylvata*, Scop., of S. China origin. *Hemerophila emaria*, Brm.—Somewhat similar to *abruptaria*, Thbg. *Timandra amata*, L.—A very pale specimen, probably worn. *Aspitates formosaria*, Ev.—A pretty species very local in West Europe but common in E. Asia. *Chiasmia clathrata*, L.—The Eastern specimens are a combination of *chretieni*, Th.-Mg., ground colour pure white without yellow admixture and *cancellaria*, Hb., in which all transverse bands are present but often narrowed into mere lines. One example sent is an extreme *cancellaria*.

Dermaleipa juno, Dalm.—A long-known striking Indian species of the subfamily *Catocalinae*. The forewing shades of brown, the hindwing with basal area jet black containing a light blue irregular and incomplete band, with a wide outer margining area crimson. Found also in Japan, China, and the Amur. *Phytometra chryson*, Esp.—The brassy blotch somewhat ill-defined. *Scoliopteryx libatrix*, L.—A typical example: this species is found also in Canada. *Rhizedra (Calamia) lutosa*, Hb.—The usual dull white dusty form, not the *griseata*, Warr., of Japan, etc. *Eustrotia uncula*, Cl.—A very pale example and unusually small. It may have been paled by long exposure. *E. candidula*, Schiff.—A normal form like those from Eastern Europe. *Heliothis (Chloridea) dipsacea*, L.—A typical form and not the large Eastern Asia form *adaucta*, Btlr. *Hydroecia basalipunctata*, Graes.?—A small species of a deep yellow ground with orange-red dusting. Another *Phytometra* is *P. festata*, Graes.—This is a paler and smaller species than *P. festucae*, L., of which it takes the place in the East.

Amongst the Pyrales received were *Orobena extimalis*, Scop., *Botys fuscalis*, Schiff., *Psammotis hyalinalis*, Hb., *Loxostege verticalis*, L., *Pionea forficalis*, L., *Endotricha flammealis*, Schiff., *Crambus perlellus*, Scop., and f. *warringtonellus*, Stain., *Ilithyia semirubella*, Scop., *Eurhynpara urticalis*, L., and *Hydrocampa nymphaeata*, Schiff.

Amongst the Deltoids identified were *Colobochyla salicalis*, Esp., and ab. *lactalis*, Stdg., *Herminia derivalis*, Hb., *H. crinalis*, Hb., *Aethia trilinealis*, Brem., *Zanclognatha tarsipennalis*, Hb.

Mr H. O. Wells.—*Lysandra coridon*, Poda, ab. *striata*, from Epsom, where the insect was abundant. *Coenonympha pamphilus*, L.—An example without spots and one with white blotches on three wings.

Baron de Worms.—Bred series of *Callimorpha dominula*, L., Wilts. *Acronicta tridens*, Schiff., from Cotswold ova. *Agrotis ashworthii*, Dbldy., from larvae collected in N. Wales. *Triphaena comes*, Hbn.—A series of 80 examples bred from a ♀ taken at Forres, including many forms of ab. *consequa*, Hbn., ab. *rufescens*, Tutt, ab. *curtisii*, Newn. *Nonagria geminipuncta*, Hatch., *Dyschorista (Orthosia) fissipuncta*, Haw., and *Triphosa dubitata*, L., from the Salisbury area. *Euphyia rubidata*, Schiff., from ova laid by a Sussex ♀. *Callimorpha dominula*,

L.—A remarkable bred specimen having the forewings ochreous, the hindwings rosy red with the black markings replaced by pale brown, Wilts. *Oria musculosa*, Hb.—Specimens taken near Salisbury with a batch of ova, the first to be obtained in this country. Captured series of *Harmodia (Dianthoecia) nana*, Rott. (*consersa*, Esp.), from the Surrey downs, and *Chlorissa (Nemoria) viridata*, L., from Surrey heaths. Aberrations and rarities taken or bred in 1940. *Pieris napi*, L.—A diminutive specimen measuring 3 cm. taken near Salisbury. *Maniola (Epinephele) jurtina*, L.—Several xanthic examples and others with large and small ocelli. *Coenonympha pamphilus*, L.—A straw-coloured ♀, Salisbury. *Heodes phlaeas*, L., with much enlarged spots on under side. *Aricia agestis*, Hb. (*astrarche*, Brgstr.).—A diminutive example from Wilts. *Polyommatus (Lysandra) coridon*, Poda.—A male ab. *obsoleta*, Tutt: a form with white under side: a fine ab. *caeca* ♀ and other *obsoleta* forms: an ab. *fowleri*, Sth. *Polyommatus (Lysandra) bellargus*, Rott., ab. *parvipuncta*, Tutt. *Polyommatus icarus*, Rott.—An example of ab. *extensa* on forewings.

Mr L. T. Ford.—A large number of species collected around Morecambe, Lancs., a district quite new to him. His captures were mainly Micros. The few Macro-Lepidoptera noted were *Erebia aethiops*, Esp., *Coenonympha tullia*, Müll. (*davus*, Fb.), *Phothedes captiuncula*, Tr., *Polia chi*, L., *Odezia atrata*, L., and *Carsia paludata*, Thnbg., and in addition a *Vanessa c-album*, L.—March. A freshly killed and somewhat battered specimen lying on the road near Torrisholme; probably hit by a car.

Amongst the more interesting species captured or seen were:—*Crambus margaritellus*, Hb.—30th June. Abundant on Meathop Moss, resting in the daytime mainly in small fir trees and flying wildly when disturbed therefrom. *Crambus falsellus*, Schiff.—June. Larvae of this species could be found feeding on moss growing on the top of stone walls all over the district. Imagines emerged throughout July and until the middle of August. *Scoparia truncicolella*, Stain., and *S. crataegella*, Hb.—17th August. At 7.30 p.m., *S. crataegella* were flying freely on the middle slopes of Warton Crag, over mixed bracken and heather. At the same time *S. truncicolella* could be found at rest on the large limestone rocks amongst the bracken, harmonizing very closely with the stone. *Phalonia rupicola*, Curt. *Philedone gerningana*, Schiff.—3rd August. Imagines flying freely in the late afternoon on the southern slopes of Arnside Knott accompanied by swarms of *Peronea aspersana*, Hb., *Tortrix paleana*, Hb., and *Peronea rufana*, Schiff. *Peronea lipsiana*, Schiff., and *P. rufana*, Schiff.—14th July. Larvae plentiful on a moss near Whitbarrow feeding in the spun shoots of bog myrtle. About 80% of the larvae were parasitized; the remainder produced a varied series of *P. rufana* and about a dozen *P. lipsiana*. *P. calidoniana*, Steph., and *Eucosma mercuriana*, Hb.—4th August. Both of these species were plentiful flying over the heather on the slopes of Barn Fell in the late afternoon. *Ancyliis biarcuana*, Steph. (*diminutana*, Haw.).

Eucosma vacciniana, Zell.—1st June. Flying about 6 p.m. in large numbers over bilberry growing on the roadside banks approaching the top of Caton Moor from Brookhouse. *E. pygmaeana*, Hb., and *Argyroproctoe dimidiana*, Sodof. *Argyroproctoe rufana*, Scop.—30th June. Mr Wright kindly showed me a locality near Witherslack for this very local species. The imagines are, it seems, only to be found amongst bramble growing on stony ground. From such a patch of bramble, a few square yards in area, I dislodged several specimens, which fly freely when disturbed in the daytime. The land surrounding the bramble patch was grass-land with bramble bushes, thistles, etc. I could not find a single specimen except on the stony patch. *Gelechia longicornis*, Curt., and *G. velocella*, Dup. *Phthorimaea viscariella*, Logan.—April. Larvae feeding in the spun shoots of *Lychnis* in lanes near Bare. The larva lives in the stem and comes up to feed on the flower buds. *Amphisbatis incongruella*, Stain.—28th April. Imagines flying at mid-day over the waist-high heather on a Moss near Witherslack. The imago did not fly except on a still sunny day—a very rare event in this locality. *Depressaria ocellana*, Fb., and *D. carduella*, Tr. *Depressaria angelicella*, Stain.—May. Larvae feeding in the young leaves of *Heracleum sphondylium*, L., spun together in a thick sticky mass, each “spinning” containing 5 or 6 larvae. Hitherto I have found the larvae of this species only on *Angelica*. I was much struck with the extraordinary abundance of the larvae and also larvae of *D. propinquella*, Tr., *D. arenella*, Schiff., *D. ciliella*, Stain., and *D. applana*, Fb., the last occurring in vast numbers in the lanes near Bare and Torrisholme. *Elachista kilmunella*, Stain.—19th May. Plentiful on Meathop Moss, commencing to fly about 5.30 p.m. for an hour or so. *Elachista perplexella*, Sta.—April. Larvae in fair numbers feeding in the tips of leaves of *Aira caespitosa*, L., growing by the roadside near Aughton. *E. subalbidella*, Schl.—26th May.—Imagines beaten out of the lower branches of small birch trees on Meathop Moss. *Scythris fallacella*, Schlag.—26th May. Flying freely in the early afternoon over *Helianthemum* with which some rough ground near Meathop Moss is carpeted. This species was on the wing throughout June. The larva feeds on the leaves of *Helianthemum*, spinning a silken tube extending from the roots to the lower leaves of the food-plant. In sunny weather the larva can occasionally be seen on the upper leaves; if disturbed it quickly retreats into the silken tube. *S. fletcherella*, Durr. (*fuscocupraea*, Meyr.). *Coleophora adjunctella*, Hodgk.—5th June. The salt marshes at Bolton-le-Sands extend for some miles, the herbage thereon being very short—quite different from the salt marshes in the Thames estuary. The evening of the 5th June was still and warm and at 8 p.m. the imagines of *C. adjunctella*, *Aristotelia brizella*, Tr., *Bucculatrix maritima*, Stain., *Phalonia vectisana*, Ww., and *Polychrosis littoralis*, Curt., were on the wing in countless numbers. In September I found the cases of *C. adjunctella* feeding on the seeds of *Juncus gerardi*, Loisl. *Coleophora obtusella*, Stain.—November. Larvae feeding on the seeds of *Juncus maritimus*, Sm., growing on the salt marsh at Carnforth, in considerable numbers. A new record for Lancashire I have

been told. In the following September I found cases of this species in quantity on the Lochorham salt marshes. *Gracillaria phasianipennella*, Hb.—18th August. Larvae abundant, feeding on *Polygonum persicaria*, L., growing on cultivated ground near Whitbarrow. The larva makes a cone with a strip bitten off the edge of a leaf, feeding on the inner side of the cone. Each larva makes 2 or 3 cones and pupates in a cocoon inside the cone on which it has last fed. About 90% of the larvae I collected were parasitized. In early September the imagines could be smoked out of clumps of heather growing at least 100 yards from the feeding ground in great numbers. *Lithocolletis heegeriella*, Zell. *Sterrhopteryx hirsutella*, Hb.—23rd June. I found two cases of this rare species on Meathop Moss, each attached to the upper side of a leaf of a small birch tree. One case produced an ichneumon fly, the other still has a living larva in it.

FIELD MEETINGS, 1940.

The Council decided early in the year to carry on the Field Meetings in spite of war conditions, though in a modified form compared with the previous few years. A programme was arranged accordingly, the districts chosen being within easy reach of London. By the end of August, however, the difficulties of transport and changed conditions rendered it advisable to cancel the remaining fixtures. However, eight meetings were held, though the number attending the last few was small.

Space available in the present volume of the "Proceedings" being limited, only two meetings are recorded in full—of the remainder only short records can be given.

6th April 1940. OXSHOTT. *Leader*: Mr F. J. COULSON. The usual spring Lepidoptera were fairly abundant and a good number of galled willow twigs collected in hope of breeding *Synanthedon (Aegeria) flaviventris*, Stdgr.

21st April 1940. BOOKHAM COMMON. *Leader*: Mr F. D. COOTE. The records of those working for Lepidoptera were few and confined to species usually obtained in the locality at this time of the year. Coleopterists, however, reaped a good harvest, mainly in the ponds at the bottom of the slopes. Messrs Attwood, Buck, and Coulson recorded 67 species. Mr F. D. Buck reported that of 32 species taken by him only three had been previously noted by him at Bookham.

4th May 1940. EFFINGHAM. *Leader*: Mr T. R. EAGLES (see below).

19th May 1940. CHILWORTH. *Leader*: Mr R. J. BURTON. Bad weather in past years has been the usual experience for meetings in this district, but on this occasion the weather was glorious. The larvae of *Thecla w-album*, Kn., were full fed and this accounts in all probability for so few being taken. Larvae of *Thecla quercus*, L., and *O. circellaris*, Hufn., were reported among others, also imagoes of *Drepana harpagula*, Esp., otherwise only the usual Lepidoptera were noted. The coleopterists spent most of the morning at the pond by the mill and secured a fine series of the coloured forms of *Plateumaris sericea*, L. (?), from the sedges.

16th June 1940. CHALFONT. *Leader*: Mr B. S. GOODBAN. *Euchoccia blomeri*, Curt., were found freshly emerged but not abundant. *Abrazas ulmata*, Fabr. (*sylvata*, Scop.), were also just emerging. Mr Goodban secured a specimen of *Stauropus fagi*, L., but further search for this insect was unsuccessful. The weather was very poor and the party confined their attention to the woods.

29th June 1940. BOX HILL. *Leader*: Mr E. E. SYMS. Probably owing to the continuous dry weather during the previous weeks insects were scarce. One interesting record was an imago of *Thecla w-album*, Kn., captured near the stepping stones at the foot of the hill.

27th June 1940. BYFLEET. *Leader*: Mr R. W. ATTWOOD (see below).

11th August 1940. BOOKHAM. *Leader*: Dr G. L. CONDER. Searching aspens provided ova and very young larvae of *Pygacra curtula*, L., and as the ponds were dry it was easy to work for pupae of *Nonagria typhae*, Thunb., with attendant success.

4th MAY 1940.

FIELD MEETING—EFFINGHAM.

Leader: Mr T. R. EAGLES.

Seven members and three visitors attended. The early morning was dull with a cold wind, but it soon turned warm and sunny. The shallows near the station were searched for the galls of *Synanthedon (Aegeria) flaviventris*, Stgr. Some imagines were reared in due course. One of the galls gathered as a "possible" produced several diptera. These proved to be a species of *Melanagromyza*—either *M. schineri*, Gir., or another species new to Britain. (See Proceedings, 8th August.)

It was a pleasant morning. The nightingale was singing and many spring butterflies were on the wing—such as *Pararge aegeria*, L.; *Lycænopsis argiolus*, L.; *Euchloë cardamines*, L.; *Nymphalis io*, L.; *Gonepteryx rhamni*, L.; and *Callophrys rubi*, L.

In the afternoon the party proceeded to the Pine Woods towards Ockham. One member had brought a reared female of *Saturnia pavonia*, L., for assembling. The experiment was most successful (see note). The pines yielded as usual larvae of *Thera obeliscata*, Hb., and *Ellopiæ fasciaria*, L. The weevil *Otiorrhynchus singularis*, L., was fairly common on the pines. Some recently cut stumps had attracted the beetles *Thanasimus formicarius*, L., and *Hylobius abietis*, L., no doubt bent on ovipositing. Imagines of *Anarta myrtili*, L., and of *Eupithecia nanata*, Hb., were flushed from the heather.

Note.—Five days previous to this meeting a female *Saturnia pavonia*, L., had emerged in a breeding cage and as it was a cripple I decided to try assembling. The attempt at Ashted on the Thursday failed; as there was no sunshine and only one male seen. On the next day (Friday) it laid about 30 ova, infertile, but I decided to try assembling with it the next day at the Effingham field meeting. Mr Collins, who had not seen this method of attracting males, went with me to Ockham Common, where there is a large expanse of heather land. In about ten minutes after putting the ♀ on the heather males began to arrive slowly and rarely more than one at a time. We noticed that if

a male came up against the wind and in circling round got about ten yards on the lee side it seemed to lose the scent and would not return. We then shifted to a spot where there was a larger space of heather on the windward side and then males came up in increasing numbers. Leaving Mr Collins to net the males attracted, I wandered a short distance away and found a female asleep and evidently freshly emerged. Shortly after, while we were both where we had put the crippled female, a male came up and then settled five yards away, where we found it had immediately paired with another female.

We then decided to leave, so boxed the females and noticed that males were still attracted to the spot where they had been placed.

T. D. C.

27th JULY 1940.

FIELD MEETING—BYFLEET.

Leader: Mr RICHARD W. ATTWOOD.

The customary wet day was forthcoming for this meeting. Two members formed the morning party, and two more arrived in the afternoon. A walk along the tow-path in the morning was all that could be done, and then a scurry back to the shelter of the bridge until an exceptionally heavy downpour was over. The trees were too wet to beat, and little collecting could be done until the afternoon.

The afternoon turned out bright and sunny and a prolonged search was made for the larvae of *Collix sparsata*, Fr., on the yellow loosestrife, but only three were obtained. There was an extraordinary abundance of white butterflies, and there appeared to be an influx of *Plusia gamma*, L., which were plentiful on the heather. *Colias croceus*, Frer., was taken hereabouts, and other butterflies noted were *Plebeius argus*, L. (*aegon*, Schiff.), *Maniola tithonus*, L., *Eumenis semele*, L., *Pararge megera*, L., *Heodes phlaeas*, L., *Coenonympha pamphilus*, L., and *Maniola jurtina*, L. (*janira*, L.). Numbers of *Euproctis similis*, Fies., were noted on the bracken, and an early *Catocala nupta*, L., was seen on a tree trunk. The Pyrale *Hydrocampa stagnata*, Don., was common on the canal bank. The Micro-lepidoptera reported were *Carcina quercana*, Fb., and *Choreutis myllerana*, Fb., the latter being disturbed from a clump of Skullcap.

The only other larvae apart from *Collix sparsata* were *Laotoë* (*Smerinthus*) *populi*, L., and *Orgyia antiqua*, L. The latter were feeding on meadowsweet, which was thought to be an unusual foodplant for this insect. The Grasshoppers *Metrioptera brachyptera*, L., were plentiful on the heathy stretch of the common, and it was noticeable that in certain sectors the insects were fully grown, whilst in others which appeared similar in every respect the Grasshoppers were all immature. The Cockroach *Ectobius livida*, Fb. (?), was beaten out of the vegetation on the canal bank and a few beetles were taken. The Donacias were particularly plentiful, some five or six occurring on a

single leaf, but of only two species. In spite of the weather conditions in the morning, the outing was very pleasant, and the varied insect life took our thoughts off the war for a time. We were not allowed, however, to forget the war entirely! One of our members was carrying his beating tray fully extended when a soldier hurried up to him and enquired, "What are you doing with that there kite?" The soft answer which is reputed to turn away wrath did not seem to function on this occasion! Presumably the fixed idea that the beating tray was a kite and the unexpected reply "Catching Caterpillars" were too difficult to reconcile, our member being gruffly asked to produce his identity card.

**PAROXYNA MISELLA, LW., AND OXYNA PARIETINA, L.
(DIPTERA: TRYPETIDAE).**

A RECORD OF A FAILURE AND A SUCCESS.

By H. W. ANDREWS, F.R.E.S.

Read 13th June 1940.

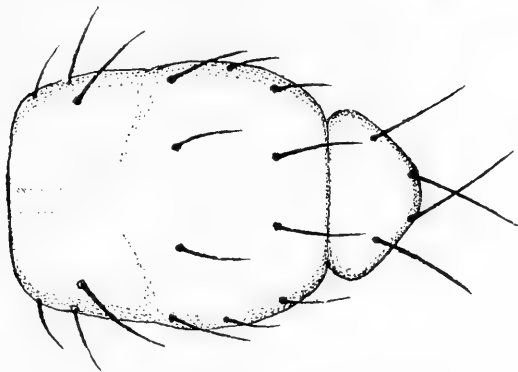
Plate I.

In the April 1939 issue of the "Journal of the Ministry of Agriculture" (Vol. xlv, No. 1) the Trypetid fly *Paroxyna misella*, Lw., was recorded as an insect pest of chrysanthemum new to Britain. Attacks by this fly had occurred in 1938 at Hampton and Harlington, Middlesex; at Gillingham, Kent; and also near Perth in Scotland. As *P. misella* was originally recorded from Southern Russia, and otherwise only known from Southern France and Spain, it appeared to be an accidental importation to this country. A small terminal stem-gall in some cases and leaf-mines in others were presumed to be due to the breeding habits of its larvae. In the case of the leaf-mines, however, specimens sent to Mr Collin proved to be *Spilographa artemisiae*, and not *P. misella*.

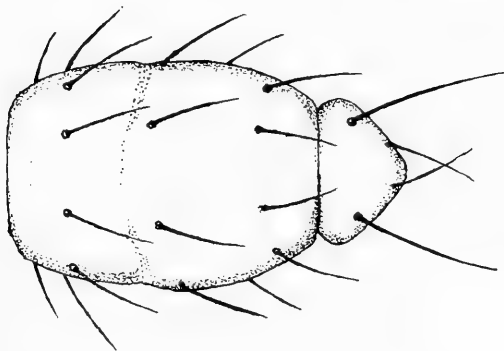
Now, since 1934 I had from time to time swept from mugwort (*Artemisia vulgaris*, L.) specimens of a Trypetid which stood in my collection under the name of *Paroxyna absinthii*, Fab., and when compiling a list of *Trypetidae* taken in N. Kent I thought it best—as Mr Collin had stated ("Ent. Record," Vol. lxix, Supplement, p. 7) that our *absinthii* was not that species but *parvula*, Lw.—to submit these specimens to him. He replied that my specimens were neither *absinthii* nor *parvula* but *P. misella*, Lw., and, referring me to the paper in the "Journal of the Ministry of Agriculture" mentioned above, suggested that in view of the somewhat doubtful account of its breeding habits I should try to find out if it made either flower-head or stem galls on the mugwort.

Accordingly, in November 1939, I went to the Thames Marshes at Stone, near Dartford, where my specimens had been taken, and searched the mugwort carefully but failed to find any trace of either flower-head or stem-galls; nor did renewed searchings at Eltham and Bexley, in both of which places I found the fly on mugwort in 1940, bring any success, no galls being discovered and mined leaves proving lepidopterous; thus the problem of the breeding habits of the wild *P. misella* remains unsolved.

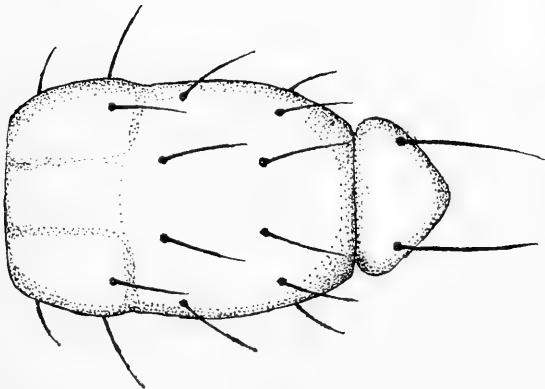
The above paragraphs record the failure; now for the success. When in searching the mugwort plants in November 1939 I failed to find either flower-head or stem galls, I tried slitting up some of the stems as a last resort. Here I did find Trypetid larvae in some numbers, though there



O. PARIETINA.



O. FLAVIPENNIS.



O. PROBOSCIDEA.

B. N. B. del.

were no external signs of habitation at all. The larvae seemed too large for *P. misella*, which is a small species, and I suspected I might have come across *Oxya parietina*, L., which species is recorded as breeding in the stems of *Artemisia vulgaris*, although it is stated to make "a swelling or thickening about the size of a hazel-nut (noisette)." I collected a number of the stems, which I placed in a bucket of damp sand and left in an outhouse for the winter. I also sent a few tenanted stems to Mr Collin. Towards the end of May 1940 both Mr Collin and I bred *O. parietina* from these stems. They did not emerge in any considerable numbers, however, and while examination of the stems showed some with small emergence holes (? bored by the larvae before pupation) other stems had incompletely developed dead flies inside. Possibly the stems in the outhouse got too hard and should have been left exposed to the weather, but, as will be seen, I have had no opportunity of further experiments.

As I had not bred sufficient specimens to supply my friends, I went to Stone on 1st June 1940 and found the fly out in abundance. It was not, however, in evidence on leaves or heads of flowering plants and all my captures were made by sweeping the growing mugwort plants. In response to a later suggestion by Mr Collin, who wrote "it would be interesting to find out how long these flies are about, I have an idea that many of these apparently rare Trypetids only last a short time and do not stray away from their food plants," I went again to Stone on the 22nd June, but just as I was approaching the *parietina* locality I was accosted by a patrol of Local Defence Volunteers, who, after inspecting my identity card, politely refused to let me continue, and, in fact, warned me off the locality, so I was unable to ascertain if *parietina* was still out, and as that whole district is now a military area I shall have to wait to the end of the war for any further investigation of that species.

The history of *O. parietina* in this country is quite interesting. Although this insect has been included in our British List, at least from the days of Walker's "Insecta Britannica" (circa 1852), which states "not rare," I have only been able to find one authentic record of its occurrence in this country, given me by Mr Collin, who has in his collection a single female taken by Dr W. J. Fordham at Clifton, Yorks, on 6.vi.19. It has been recorded in local lists from Somerset by Mr Audcent, and from Warwickshire by Mr Saunt, but on comparison with specimens I sent them, both these records proved to be erroneous, and the same applies to specimens in the British Museum and in the Hope Museum at Oxford. Being curious as to Walker's record, I wrote to the British Museum authorities and Mr R. L. Coe kindly looked into the matter for me. He found no specimens in the British Collection but a further search in the General Collections brought to light three males and one female under the name *parietina*, presented to the Museum by The Entomological Club in 1844, and labelled "England." Mr Coe also found a further record by Walker in a paper, "Descriptions of

the British Tephritites " ("Ent. Mag.," iii, 57, 1836), where this species is stated as occurring in "the south of England during the summer and autumn," and said he thought that this statement probably referred to the Entomological Club examples. On a re-examination of these specimens Mr Coe found that they were not *O. parietina*, but *O. flavipennis*, Lw., as they agreed completely with Collin's diagnosis in his paper on that species ("Ent. Record," Vol. xxvii, p. 57, March 1915). In the same way the Hope Museum specimens, as well as those from Somerset and Warwickshire, turned out to be either *O. flavipennis*, Lw., or *O. proboscidea*, Lw., thus leaving Mr Collin's specimen still the sole authentic British representative of *parietina* prior to those bred and captured from the locality at Stone in 1940.

The following table of the three closely allied species of *Oxya* is taken from Mr Collin's paper referred to in the preceding paragraph:—

Three pairs of dorso-central thoracic bristles, and normally four	
scutellar bristles: one lateral pair and one apical pair	<i>flavipennis</i> , Lw.
Two pairs of dorso-central bristles, and one pair of lateral	
scutellars, the apical pair being absent ...	<i>proboscidea</i> , Lw. (<i>nebulosa</i> , Wied.).
Two pairs of dorso-central bristles, and four scutellars, lateral	
and apical pairs as in <i>flavipennis</i>	<i>parietina</i> , L.

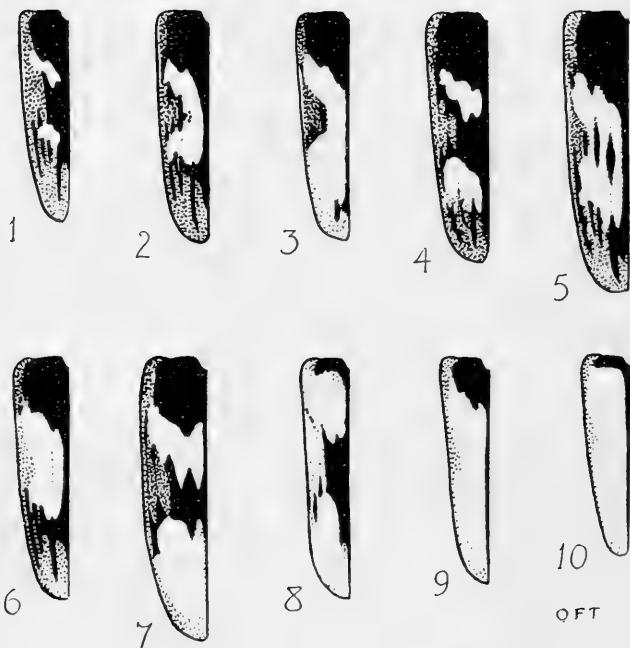
Variation in the intensity of the wing-markings illustrated by the plate accompanying Mr Collin's paper is also noticeable to a certain extent in *parietina*.

The larvae of *parietina* are recorded as living in the stems of various species of *Artemisia* and making an external gall or thickening (in the case of those found at Stone in *A. vulgaris* there was no external sign of habitation); those of *flavipennis* in fleshy galls on the root-stocks of *Achillea millefolium*, L. (Yarrow or Milfoil), and those of *proboscidea* in galls on the root-stocks of *Chrysanthemum leucanthemum*, L. (Ox-eye daisy). *Proboscidea* is, I believe, fairly widely distributed in Britain, but both *flavipennis* and *parietina* are normally very rare. In Mr Collin's paper he says that over forty years' collecting by the late Mr Verrall produced only two specimens of *flavipennis*, but in 1904 and again in 1911 Mr C. G. Lamb found that species in abundance in a limited area at St Merryn, Cornwall, and, as stated above, *parietina* was practically unknown until its occurrence at Stone last year. Séguéy in "Diptères acalypterates" records all three species as common in France.

My thanks are due to Dr B. N. Blood who so kindly drew and reproduced the sketches for the plate.

Finally, I have to thank the Editor of "The Entomologist's Record" for permission to incorporate in this paper the bulk of an article that appeared in that magazine in September 1940 (Vol. lii, pp. 96-97).





RHAGIUM BIFASCIATUM, FAB., AND ITS VARIETIES IN BRITAIN.

By K. G. BLAIR, D.Sc., F.R.E.S.

Read 27th June.

Plate II.

This common Longicorn beetle is well known for the wide range of colour variations it affords, many of the forms being of relatively constant occurrence, though frequently intermediate stages are to be found. Many of these forms were described by the older writers as species; thus Marsham (1802, "Coleoptera Britannica") described three in addition to the normal form as distinct species, though Stephens (1831, "Ill. Brit. Ent. Mand.," iv) recognizing them, and correctly, as mere forms of *bifasciatum*, contented himself with merely indicating what they were, without even mentioning the names assigned to them by Marsham. It is probably this action of Stephens' that has led to the Marshamian names having been overlooked by most subsequent writers upon the species until they were revived by Aurivillius (1912, Junk, "Col. Cat.," pars 27). Later British writers, and British collectors in general, seem to have entirely neglected the species, and it is to draw their attention to what has been done by Continental workers, and more especially to establish the position of the forms named by one of the pioneers of the study of our British Coleoptera, that the following notes are offered.

The normal form of the species has, of course, two oblique yellow spots on each elytron, one before and one behind the middle, on a blackish or dark metallic ground; in addition there is a certain amount of a dull reddish colour along the lateral margin and at the apex. Generally speaking, variation takes place in opposite directions from the normal, *i.e.*, in the increase or diminution of these yellow spots. Variation in the latter direction is on the Continent frequently accompanied by an increase in the red colour, at the expense apparently not only of the posterior yellow spot but also of the blackish colour, but hitherto I have not seen any examples of this type of variation in British material, though I see no reason why it should not occur.

The different forms may be roughly tabulated as follows, though as mentioned above intermediate stages between many of them occur and in many cases have received different names.

Yellow spots enlarged.

Anterior spot produced backwards near suture to meet posterior spot.

Apex normally dark, largely red.

Connection between spots narrow *v. gravei*, Hubenthal, 1902.

Connection broader (fig. 2) *v. connexum*, Everts, 1918.

Apical patch reduced to small subsutural spot (fig. 3)

v. bimaculatum, Marsham, 1802.

Spots enlarged but disconnected or broadly confluent.

Spots disconnected; i.e. median dark band entire.

Base and apex also broadly dark (fig. 4 approaches this)

v. latefasciatum, Pic, 1891.

Yellow extends to apex.

Base broadly dark (fig. 7) *v. lituratum*, Fugn., 1891.

Yellow extends also almost to base (fig. 8)

v. medtofasciatum, Pic, 1912.

Median band interrupted or absent.

Band broken up into elongated spots (fig. 5)

v. nigrolineatum, Donovan, 1801 (Marsham, 1802).

Median band wanting.

Base and apex broadly dark (fig. 6) *v. ornatum*, Fab., 1775
= *dorsale*, Marsham, 1802 = *ecoffeti*, Mulsant, 1839.

Base alone broadly dark (fig. 9) *v. simoni*, Blair, 1940.

Elytra almost wholly yellow (fig. 10) ... *v. ictericum*, Schleicher, 1924.
= *lebsi*, Dayr., 1935.

Yellow spots reduced.

Anterior spot divided; marginal red remains normal.

Anterior spot divided into two *v. bistrinotatum*, Pic, 1914.

Anterior spot reduced to small fragments or wanting

v. infasciatum, Pic, 1898.

Marginal red encroaches.

Obliterates posterior spot *v. unifasciatum*, Mulsant, 1839.

Occupies whole middle area of elytra.

Leaving base and apex dark *v. bicolor*, Olivier, 1795.

Occupies whole elytra except extreme base *v. rufum*, Prell, 1908.

From this it will be seen that variation by enlargement of the yellow areas follows three different lines: (1) fusion of the yellow spots near suture only; (2) more general fusion across the elytra; (3) reduction of dark area at apex, and that the last two forms illustrated may equally well be considered as the extremes of any of these series. With regard to variation by reduction of the yellow spots, I have hitherto seen in British material nothing more striking than the reduced anterior spot being crossed by a fine black line, a form which perhaps approaches *v. bistrinotatum*. On the continent, however, *v. unifasciatum* is said to be the most frequent variety of the species, and may certainly be expected with us. The *v. bicolor*, Oliv., corresponds closely with *v. ornatum*, F., and by Aurivillius is considered to be synonymous with it, but Olivier's figure appears to emphasize the red, so that the form is perhaps better placed as above. Similarly, *v. rufum*, Prell, would appear to correspond with *v. ictericum*, Schleich., with the red replacing the yellow.

It should be noted that the form recently introduced by Kaufmann as new to the British list under the name *v. infasciatum*, Pic,* is wrongly determined. Mr Kaufmann has kindly allowed me to see the specimens, which are really *v. Simoni*, mi.

As some indication of the relative frequency with which the various forms occur I give a list of those hitherto seen by me, with the locality and the collection in which each exists. Owing, however, to the difficulties occasioned by the war I regret that apart from the collections in

*"The Naturalist," 1940, p. 147.

the British Museum, i.e. the Stephens, Power, Sharp and Donisthorpe Collections and the Joy Coll. in the possession of this Society, I have seen only those of the late Mr G. C. Champion and of Messrs J. R. Le B. Tomlin and S. R. Ashby, to whom and to Prof. H. G. Champion I must express my warmest thanks for the facilities so kindly afforded.

Little or no information is available as to the heritability of the tendency to vary. The comparatively few localities noted for the variations, and their frequent repetition, probably mean no more than that the species is particularly plentiful there and more frequently collected, and that there is a tendency to variability anywhere where it does occur. More careful collecting may, however, show that this tendency is stronger in some localities than in others, also that one stump or log may produce several varieties whereas in others all beetles will be normal, thus suggesting that certain broods, perhaps those originating from a variety, will exhibit a stronger tendency to vary than others. Direct breeding from a known parent or parents would of course be very much more satisfactory, but in view of the long life cycle and the difficulty in keeping the wood in proper condition will not be easy to carry out.

MATERIAL EXAMINED.

- v. *Gravei*, Hubenth. (incl. v. *connexum*, Everts).
 1 ♀, New Forest, Hants (Tomlin).
 1 ♂, 2 ♀, Woking, Surrey (Champion); 1 ♂, Oxshott, Surrey (Donisthorpe).
 1 ♀, Chartley Moss, Staffs (ex Shepherd in Coll. Tomlin).
 1 ♂, (Stephens); 1 ♀ (Brit. Mus.).
- v. *hinaculatum*, Marsh.
 1 ♀, (Stephens).
- v. *latefasciatum*, Pic (near).
 1 ♀, Oxshott (K. G. B.).
- v. *nigrolineatum*, Donov.
 1 ♀, New Forest (Ashby).
 2 ♀, Hurtwood, Surrey (Champion).
 1 ♀, Windsor, Berks (Donisthorpe).
 1 ♀, Rickmansworth, Herts (Ashby).
 1 ♂, Manchester Dist., Lancs (Tomlin).
 1 ♀, (Stephens); 2 ♀ (Brit. Mus.); 1 ♀ (Sharp); 1 ♀ (Champion, ex Stevens).
- v. *ornatum*, F.
 1 ♂, 2 ♀, New Forest (Tomlin). 1 ♀ (C. Morley).
 1 ♂, 1 ♀, Hurtwood (Ashby).
 1 ♂, Weybridge, Surrey (Brit. Mus.).
 1 ♀, (Brit. Mus.), 1 ♂ (type of *dorsule*, Marsh., Stephens). 1 ♂, Dollman Coll., no loc.
- v. *lituratum*, Fugn.
 1 ♀, Delamere, Cheshire; 1 ♀, ex Crotch (Tomlin).
 1 ♀, (Brit. Mus.); 1 ♂, 1 ♀ (Champion, ex Stevens).
- v. *mediofasciatum*, Pic.
 1 ♂. (Brit. Mus.); 1 ♂, 1 ♀ (Stephens); 2 ♀ (Champion, ex Stevens).
- v. *Simoni*, Blair.
 1 ♀, New Forest (Donisthorpe); 1 ♂, 1 ♀, New Forest (Tomlin).
 1 ♂, Kenilworth, Warwick (A. H. Newton).
 2 ♀, Panel Ash, Yorks (R. Kaufmann).
 1 ♂, (Tomlin, ex Crotch).

v. ictericum, Schleich.

1 ♂, New Forest (Donisthorpe).

1 ♂, 1 ♀, Hurtwood (Ashby); 1 ♂, Albury, Surrey (Champion).

1 ♂, N. of England (Brit. Mus.).

1 ♂, Killin, Perth (K. G. B.).

1 ♂, 1 ♀, (Brit. Mus.).

EXPLANATION OF FIGURES.

1. Normal (spots slightly reduced). 2. *v. connerum*, Ev. 3. *v. bimaculatum*, Marsh. 4. Approaching *v. latefasciatum*, Pic. 5. *v. nigrolineatum*, Donovan. 6. *v. ornatum*, Fab. 7. *v. tituratum*, Fugn. 8. *v. medifasciatum*, Pic. 9. *v. Simoni*, Blair. 10. *v. ictericum*, Schleicher.

RECENT CAPTURES AND BREEDING OF MICRO-LEPIDOPTERA.

Read by S. WAKELY, 22nd August 1940.

In these troublous times the collecting of lepidoptera has to be curtailed, but to those who are keen it is surprising what a variety of species can be taken even in the suburbs of London. In addition, in my case at least, friends often send local species in various stages, which give me much pleasure to see and endeavour to rear.

In the following notes I will just pass a few remarks about the fifty or sixty species selected for exhibition and which came my way recently.

First of all, *Salebria obductella*, F. R., was considered a rare immigrant until a few years ago, when Mr Huggins found a few larvae feeding on Marjoram in S.E. Kent. Not long after, Mr L. T. Ford discovered the larvae in even greater numbers near Canterbury, and I was fortunate enough to be able to breed a fine series last year. One also emerged this year from two larvae found on the old food plant in the garden a few months ago, which had resulted from a pairing in captivity.

Three species of *Homocosoma* are shown. *H. binaevella*, Hübn., larvae are common in thistle heads (*Carduus lanceolatus*) in September, and are of a delicate green colour with pinkish lines. They occur freely at Ashted, Surrey, as well as at Benfleet, Essex. *H. cretacella*, Rössl., and *H. saxicola*, Vaughan, are very similar in the imago stage, but the former has a dark purplish-brown larva, while the larva of *H. saxicola* is yellowish-green. My larvae of *cretacella* were found in July feeding in shoots of Ragwort and Tansy protected with web which was easy to detect as it was mixed with frass and excavated material; while the larvae of *H. saxicola* were much more difficult to find in late August in the Ragwort flowers.

Larvae of *Myelois neophanes*, Durr., are not uncommon nowadays feeding in the round black fungus (*Daldinia concentrica*, Grev.), which grows so freely on birch trees that have suffered from fire. It also occurs among gorse, on which plant the fungus is much smaller and browner in colour. While some authorities say that both forms are the same species of *Daldinia*, a friend tells me the brownish gorse species is not *Daldinia* at all, but is really *Bulgarica polymorpha*, Wettstein. Not knowing much about fungi, I must leave this point for the experts.*

Psammotis hyalinalis, Hübn., is not uncommon at Mickleham, Surrey, but is a local insect. The first specimen of *Pyrausta nubilalis*, Hübn., which I took at Benfleet, Essex, I mistook for the former species,

*Dr J. Ramsbottom of the B.M. (Nat. Hist.) informs me that the *Bulgarica* sp. is a succulent cup-shaped fungus of a rubbery texture, quite different from *Daldinia* which is nodular and hard. If the two fungi in question here are similar, they are probably *Daldinia* sp.—C. N. H.

but it will be seen on comparison that they are quite distinct. The dark males of *P. nubilalis* are very striking, and it will be noted that there is a fair amount of variation in the depth of colour of both sexes. Some newly-hatched larvae of *P. nubilalis* are now feeding freely on *Artemisia vulgaris*, and I notice they will eat the leaves as well as burrow into the stems. This species is the "European Corn Borer Moth" of America, where it does incredible damage in some years to the maize crops. In central Europe it is frequently a pest in millet, and was undoubtedly introduced to the New World from cargoes of this plant imported for the manufacture of brooms.

Pyrausta asinalis, Hübn., occurs among Madder (*Rubia peregrina*), and the larvae are difficult to find in the spring as they hide in the curled dead lower leaves, which they spin up to make detection even more difficult. My specimens came from Portland.

The fine specimen of *Crambus dumetellus*, Hübn., was taken in Sussex. This species is one I am constantly looking for, but the present specimen is the second one that has ever come my way. *Crambus falsellus*, Schiff., is another local species of which I have just bred a fine series from larvae sent by Mr Ford. They were feeding on a wall moss and were taken at Grange-over-Sands, Lancashire. *Crambus paludellus*, Hübn., is a species attached to the Bullrush (*Typha*), and may be bred from dead stems collected in June. The dead plants should be taken that show no signs of an old flowering stem.

Thanks to Mr Bainbrigge-Fletcher, a good many of us have a series of the handsome plume, *Pselnophorus brachylactylus*, Treits., and it may be as well to mention that there is a colony of this species in Surrey now from the Gloucestershire stock. It feeds on the Wall Lettuce (*Lactuca muralis*, Frsn.). Another rare and local insect on this latter plant is *Phalonia gilvicomana*, Zeller, of which I bred a few this June. The larvae feed on the seeds in late July. *P. flaviciliata*, Wilk., is a very showy species in the same genus. The larvae feed on the seeds of *Knautia arvensis*, L., and it was noticed that sunshine was necessary to make the moths emerge.

Euxanthia aeneana, Hübn., is also a particularly pleasing species to the eye. The best way to get it is to collect ragwort roots in the autumn, at a spot where it occurs. Those shown came from Benfleet. The larvae are whitish in colour, and easily distinguished from another species (*Eucosma trigeminana*, Steph.), which has a bright pink larva and occurs with it on the same plant. *Tortrix costana*, Fab., is an extremely variable species; those shown were bred from larvae found in spun shoots of Willow-Herb and other plants.

Pammene regiana, Zell., is common among sycamore at Norwood, where the larvae may be found under flakes of the bark. *P. trauniana*, Schiff., is a much more local insect, and is attached to maple—both species feeding on the seeds. The latter can be taken at end of May by a long-handled net as it flies around the tops of maples. When disturbed it does not stray far from the tops of the trees, and the height

at which it flies makes its capture difficult. My thanks are due to Mr Ford of Bexley for those I have.

During the winter I was pruning an apple tree and noticed a dead branch with a number of old borings made by some insect. On the branch being split open, several larvae were seen, which I did not examine closely, but hoped were the Clearwing, *Synanthedon (Aegeria) myopiformis*, Borkh. The branch was carefully tied together again and kept and to my surprise I bred nearly a score of the Apple Codlin Moth (*Laspeyresia pomonella*, L.) during June.

In my garden two moths occur among the *Chenopodium*—*Aristotelia stipella*, Hübn., and *A. hermannella*, Fabr. The latter is a brightly-coloured little species, and its greenish larval mines are most frequently found in the Many-seeded Goosefoot (*Chenopodium polyspermum*, L.) The *A. stipella* mines are whitish, and very distinct.

Phthorimaea viscariaella, Staint., feeds in the shoots of Red Campion in the larval state. This species evidently does not occur in the south, and those shown were sent to me by Mr Ford and came from Morecambe, Lancashire. They pupated in old stems of Wild Parsnip and came through well.

It is strange to find a larva with a portable case among the *Gelechiidae*, but *Thiotricha subocellea*, Steph., has this distinction. The case is made of flowerets of Marjoram on which the larvae feed. It occurs at Coulsdon.

Nearly all the genus *Mompha* feed on Willow Herb. *M. ochracella*, Staint., feeds on the large Willow Herb (*Epilobium hirsutum*, L.). It may be found in the root stocks, but is best taken when spun up on the leaves. It causes a contraction of the leaf, which may be looked for in early June or late May. *M. propinquaella*, Staint., mines the leaves of *Epilobium montanum*, L., very early in the year when the plants are quite small. I took full fed larvae this year (1940) on the 30th of March.

Amphisbatis incongruella, Staint., flies in the sunshine over the heather in April, and occurs at Oxshott and Ockham, Surrey. The larva lives in a portable case made of hollow grass-stem, but I have never succeeded in finding one.

Depressaria douglasella, Staint., *D. purpurea*, Haw., and *D. rotundella*, Doug., all feed on Wild Carrot as larvae. They are difficult to find as they roll the leaflets in such a neat fashion, but the smallest larvae taken are often full fed within a fortnight, and a careful search is well repaid as imagines are not often seen. *D. putridella*, Schiff., is one of the very local ones occurring among *Peucedanum officinale*, L. (Hog's Fennel)—not to be confused with *Foeniculum vulgare*, Mill. (Fennel). Thanks to help I got a nice series in North Kent.

Several species of *Elachista* are shown, the larvae of which all mine various species of grasses, etc. *E. magnificella*, Tengst., larvae live in leaves of *Luzula* and the mine is very distinct, appearing like an inflated blister. *Stephensia brunnichella*, L., a brightly coloured species, mines the leaves of Calamint (*Satureia calamintha*), a common plant on our

chalk downs. The pupae may often be found in a slight cocoon on nearby leaf if too late for larvae.

The fine dark var. of *Prays curtisellus*, Don., was taken in my garden. It is a well-known aberration. Mr Brown, of Bournemouth, sent me some larvae a few weeks ago and among them was a pupa of *Gracilaria azaleella*, Brantz. The moth emerged later, and I doubt if he knew this species was among the leaves. The moth is very local, and well established at Bournemouth. The larvae he sent were those of *Teichobia flicivora*, Meyrick, and the moths shown had been sent to me previously for verification. This is a noteworthy addition to our British list. Mr Brown tells me it swarms in his garden, and it is a mystery how a species, discovered in Ireland as new to science only a few years ago, should now be found flourishing at Bournemouth.

Phaulernis dentella, Zell., is a species which is seldom seen by collectors. It occurs at Riddlesdown, where the larvae feed in the seeds of *Pimpinella saxifraga*, L. I got a fine lot of pupae last year, but the emergence this year was very disappointing and I am afraid my pupae got too dry. *Antispila treitschkiella*, Fisch. von Rösl., feeds in the larval state on Dogwood, and when full grown cuts out a neat oval hole in the leaf. The oval holes are sometimes quite noticeable on the bushes. The larva falls to the ground in the piece so neatly carved out and pupates in this. There is another species in the genus with a similar habit and same food plant, but occurring a little earlier.

I have also shown some interesting species of *Eupista*, Hb. (or *Coleophora*, Zell., as they have been known for many years) with larval cases. A friend sent me cases of *E. licella*, Zeller, from Oxfordshire, but I got no moths out. A Boxhill specimen is shown to indicate what they are like.

Two other species feed on *Centaurea nigra*, L. I found only two cases of *E. alcyonipennella*, Kollar, at Kemsing, Kent, and one moth emerged. At Lewes, Sussex, I came across a fair number of cases of *E. conspicuella*, Mann., and these came out well, the moth being a particularly handsome species. One other species I might mention is *E. apicella*, Staint., two of which are shown. They were taken among Stitchwort at Bromley, Kent, and seem to be that species, which is a fine local insect.

Just by way of a fill-up I have included four fine specimens of *Synanthedon* (*Aegeria*) *flaviventris*, Stdgr., bred from larvae taken at the Oxshott Field Meeting.

**A LIST OF THE PAPERS PUBLISHED IN THE PROCEEDINGS AND
TRANSACTIONS OF THE SOUTH LONDON ENTOMOLOGICAL
AND NATURAL HISTORY SOCIETY FROM ITS
COMMENCEMENT TO 1940.**

By E. E. SYMS, F.R.E.S.

*The years in which the papers were read. They would normally be published the following year.

ADKIN, B. W.

Some Insects Injurious to Forestry *1919, p. 8-12.

ADKIN, R.

- On the Occasional Abundance of Certain Species
of Lepidoptera in the British Islands 1890, p. 62-79.
- Notes on a Few Days Collecting at Eastbourne in
August last (1891) 1891, p. 168-172.
- Notes on the Genus *Triphaena*, Och. 1891, p. 150-157.
- My Summer Holiday, 1892, Folkestone 1892, p. 71-75.
- Notes on the Cocoon of *Eriogaster lanestris* 1892, p. 67-69.
- Reflections upon Odd Rambles to the Sussex
Downs 1894, p. 114-118.
- Lazy Days by the Sea (Eastbourne) 1898, p. 50-57.
- More Lazy Days by the Sea 1899, p. 44-51.
- On the Pupation of *Cossus ligniperda* 1900, p. 1-5.
- A Life Cycle of *Acidalia marginipunctata* 1902, p. 3-9.
- On the Lengthened Period of the Pupal Stage in
Sundry Species of Lepidoptera 1905, p. 6-9.
- On the Occurrence of *Tortrix pronubana*, Hb.,
in Britain 1906, p. 13-17.
- Some Thoughts on the Probability of the Abun-
dant of certain species of Lepidoptera in
1906 being due to Immigration, and its pos-
sible effect on our Insect Fauna 1906, p. 33-37.
- Further Notes on *Tortrix pronubana*, Hb., in-
cluding its Life-History in Britain 1907, p. 20-26, Pls. 1-3.
- Notes on *Porthesia chrysorrhoea*, L. 1907, p. 12-15.
- Natural History Societies 1907, p. 34-46.
- Stray Notes on the Variation and Distribution
of *Boarmia repandata* in Britain 1909, p. 1-4, Pl. 1.
- Notes on the Earlier Stages of *Nela albulalis* ...
1909, p. 41-42, Pls. 11-12.
- Notes on *Hepialus humuli* and its Shetland
Forms 1910, p. 13-14.

- The Lepidoptera of a London Garden 1910, p. 1-12.
- Varietal Names as Applied to the British Lepidoptera 1912, p. 1-6, Pls. 1-3.
- Labelling Entomological Specimens 1912, p. 7-12.
- Tinea pallescentella*, Stainton: Some Notes on its Life-History and its History 1913, p. 1-6, Pl. 1.
- Colias edusa* in Britain 1914, p. 22-30.
- Some Lepidopterous Pupal Habitations and some Reminiscences 1914, p. 59-68, Pls. 4-8.
- The Autumn Butterflies at Eastbourne and some other Notes 1915, p. 62-67.
- Ocneria dispar* in Britain 1916, p. 1-6.
- The Weather of 1916 and the Occurrence of some Commoner Butterflies at Eastbourne 1917, p. 8-12.
- Acidalia marginipunctata*, Göze 1919, p. 3-7.
- Diacrisia mendica*: Its History and its Variation 1922, p. 48-56.
- The Lepidopterous Enemies of Man, with special reference to Species that occur in Britain ... 1922, p. 26-47.
- Diacrisia lubricipeda* and *D. lutea*: Their History and their Varieties 1923, p. 55-62.
- Some Ancient Naturalists and their Work 1923, p. 28-38.
- Entomology, Ancient and Present Day 1924, p. 28-44.
- Some Phases of Parallel Variation in the British Lepidoptera 1924, p. 8-15, Pls. 2-4.
- Melanism in the Lepidoptera: Some Theories and some Examples 1925, p. 7-21, Pl. 1.
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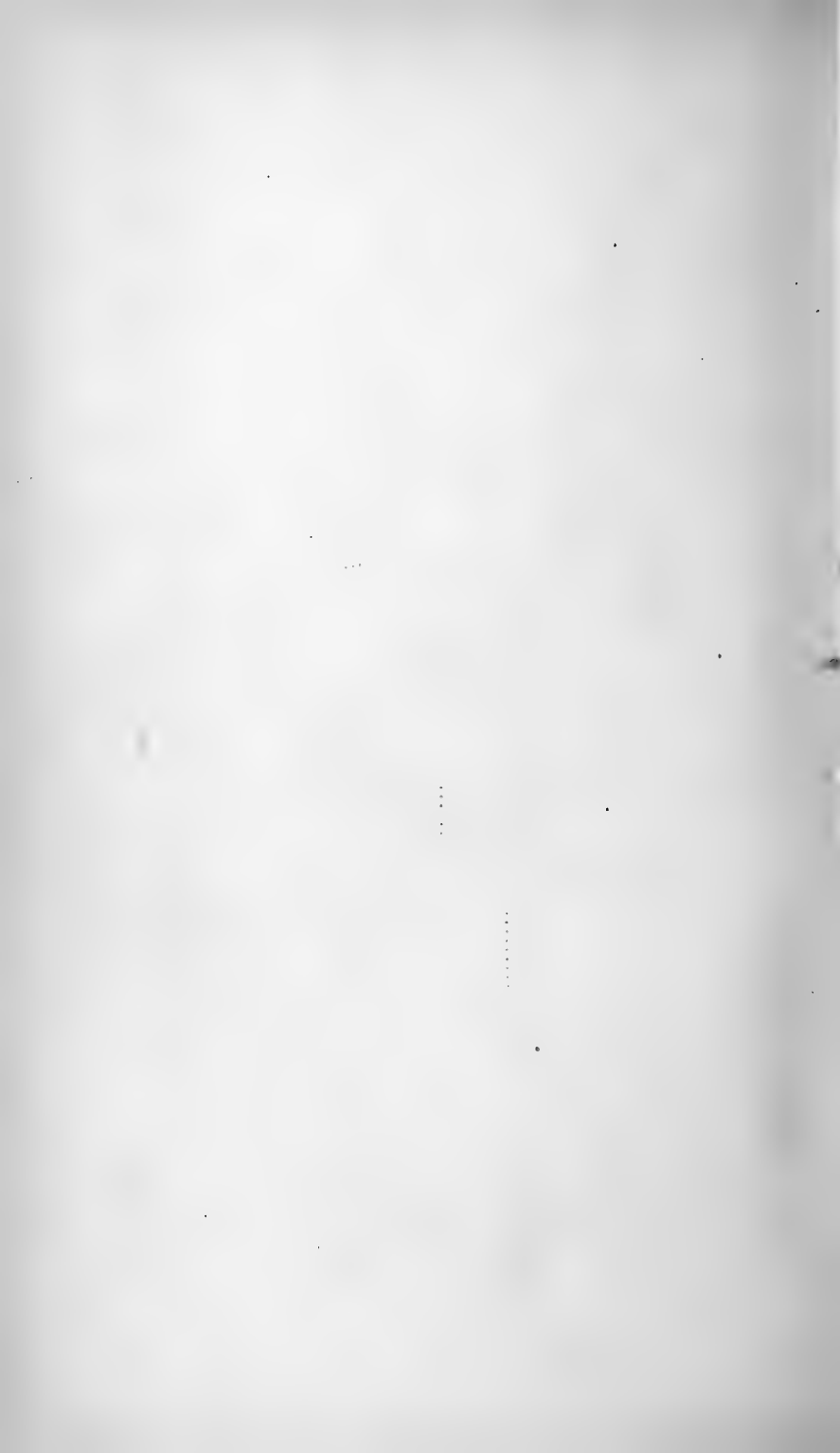
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1941-42

PART I.

WITH 4 PLATES



PUBLISHED AT THE SOCIETY'S ROOMS
THE CHAPTER HOUSE, ST THOMAS' STREET, SOUTHWARK, S.E.1

PRICE TWO SHILLINGS

THE NATURE OF HIBERNATION IN LEPIDOPTERA.

By F. V. L. JARVIS, B.Sc.

Plates I-IV.

[*Since this paper was read before the Society on May 8th, 1941, certain additions have been made as the result of further observations. The illustrations are made from my own dissections.—F. V. L. J.*]

This paper is the result of several years original research by the writer. Conclusions are based on experiment and, incomplete as it may be, it is felt that the main principles will stand up to criticism; in fact at this stage the helpful discussion and co-operation of other entomologists will be very welcome. In the attempt to find out the causes of Hibernation some hundreds of experiments and dissections have provided a mass of detail too unwieldy to catalogue here. On the other hand, unsupported statements carry little conviction; therefore, as all the data are recorded reference will be made only to specific experiments to illustrate vital points. There is evidence to show that the principles described apply to other Orders of Insects than Lepidoptera.

It is common knowledge that indigenous insects pass the winter in a dormant condition. They "hibernate." Furthermore, the great majority of species hibernate at a definite stage of internal growth peculiar to the species. At first it appeared that the solution of the problem would be merely of academic interest but later aspects of considerable economic and evolutionary importance appeared. The discussion of these developments is too extensive, unfortunately, for inclusion in this paper.

Hibernation presents a difficulty in that it is a condition of inertia giving no positive reaction, so that information has to be collected by indirect means and processes of elimination. The most useful method of analysis has been the use of steady temperatures of 65° to 75° F. over long periods maintained in a water-heated cupboard. It is essential that the *average temperature* over the period of an experiment be known accurately. The optimum average is 70° with a tolerance either way of 5°. Thus the minimum (65°) is 5° above the highest summer average, whilst the maximum of 75° is well below the lethal limit.

The important law enunciated by Van Holt which states that the activity and metabolism of cold blooded animals is doubled for every 10° C. (or 18° F.) rise in temperature within normal limits has been proved to hold true for Lepidoptera by observations on growth rates at known temperatures and also by the direct measurement of the dorsal pulse of *Polyommatus icarus* larvae. This means that a life cycle of 60 days at 52° (average) is reduced to 30 days at 70°. Van Holt's law, known temperatures, and careful recording have been the measuring apparatus in this investigation. Dissection and microscopic examination have naturally been essential. In all, eight species of butterflies and twenty-three species of moths of different families have been examined, so that the field has been fairly well covered.

The results of temperature experiments have been to grade species as follows:—

1. *Non-Hibernators*.—Complete their life cycle in a continuous period, one generation succeeding another with *no* dormant period at any stage. Probably all migrants are incapable of surviving the winter. *Colias edusa* (*croceus*) is a good example of this group. Ova laid on November 11th and kept at 65° produced imagines by the end of December. Lack of ultra-violet precluded a further pairing but there is no doubt that in suitable light conditions a fifty day cycle could be maintained.

2. *Apparent Hibernators*.—According to species the winter is passed in a dormant condition (either as larva or pupa) but heating causes prompt resumption of growth. *Examples*:—

(a) Larva of *Urapteryx sambucaria* (on ivy) half grown at the end of October produced moths in the middle of February.

(b) Young larvae of *Epinephele ianira* (*jurtina*) forced from October 23rd and fed on couch grass gave emergences between December 12th and January 16th.

(c) Pupae of *Ephyra pendularia* forced from November 1st came out in November and December.

Other species in this group are:—*Epinephele tithonus*, *Phlogophora meticulosa*, *Naenia typica*, *Drepana lacertinaria*, *Mania maura*, *Triphaena pronuba*, *Triphaena fimbria*.

3. *True Hibernators*.—There is complete inactivity, usually in winter. The application of warmth produces *no* resumption of growth, and in the case of larvae results in death, if applied early in the hibernation period, by the drying up of the body fluid. Forcing late in the hibernation period *will* produce a response as this experiment shows:—

“On October 24th a colony of recently hibernated larvae of *Nygmia phaeorrhoea* were kept at 70°. All had died by the end of November, but another colony forced from January 31st became active on February 16th, and one warmed up on February 25th came out of their web on February 28th.”

This type of experiment has been the basis for a method of measuring hibernation factor strength. Numerous experiments on other larvae and pupae give similar results. Some tested species under this heading are:—

EGG HIBERNATORS.

Orygia antiqua.

LARVAE HIBERNATORS.

Polyommatus icarus (single brooded).

Odonestis potatoaria.

Arctia caja.

Boarmia repandata.

Macrothylacia rubi.

Hylophila bicolorana.

PUPAE HIBERNATORS.

Pieris rapae (certain strains).

Pieris napi (certain strains).

Pieris brassicae (certain strains).

Smerinthus ocellatus.

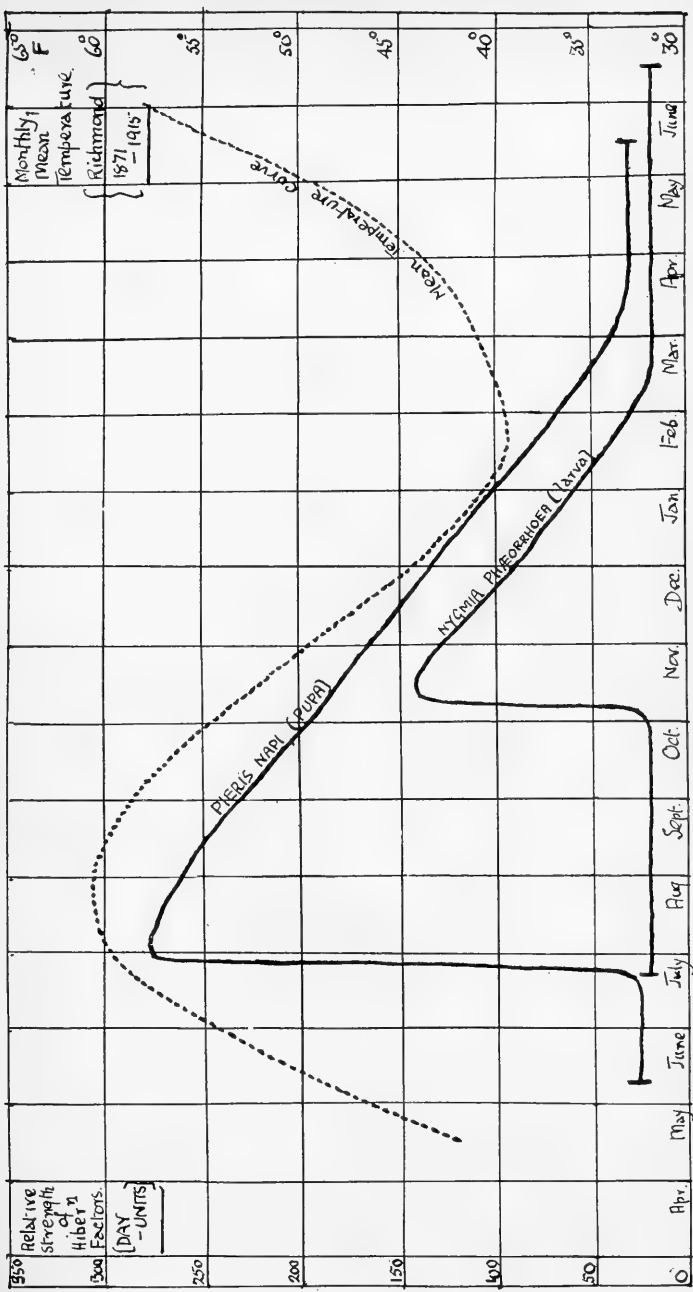
Smerinthus populi.

Dianthoecia conspersa.

Eucosmia undulata.

IMAGINES HIBERNATORS.

Aglais urticae.



TYPICAL CURVES OF TRUE HIBERNATORS

There are a number of species with short hibernation periods bridging the gap between Groups 1 and 2 and interesting as the early groups are from the evolutionary standpoint there is only space to deal now with True Hibernators.

The incidence of hibernation is rapid, the inhibition reaching maximum strength within 48 hours of the onset and the stage in the cycle at which hibernation occurs is constant for all individuals in a species except for an occasional aberrant.

The hibernation force is most readily explained by the curves for *Pieris napi* and *Nygmia phaeorrhoea* (Plate I) constructed by forcing at various periods in the dormant stage. From an abrupt maximum there is a steady decline to nothing in the early months of the year. The initial strength (measured by resistance to forcing) is approximately proportional to the length of the hibernation period and is expressed in "day units." In practice it is found (more especially with larvae) that it is fatal to attempt forcing if the hibernation factor strength is greater than 50 units. The brake on metabolism is so strong that the animal is desiccated. However, species vary in their reactions. For example, *Odonestis potatoria* larvae mostly die, but two were forced into precocious pupation two moults earlier than normal. These pupae were 0.5 inches long but soon died. On dissection they contained no fat reserve. The effect of forcing pupae in the early part of the curve is to increase the strength of the hibernation impulse. *Pieris brassicae* kept at 70° from the moment of pupation remained alive for 21 months and then died. The same species forced when their curve had fallen to half strength was retarded in emergence by two months.

In each instance it was the single brooded race of *P. brassicae*, comparable with the *P. napi* figured, that was used. It is only insects with strong factors that are retarded by heat; under 100 units there is little effect. Conversely, the action of extreme cold over a period is to *reduce* the strength of the factors. Normal ranges of outdoor temperatures, 40° to 60° F. *average*, have no appreciable effect on the length of the hibernation period. Van Holt's law only applies to the active condition. The explanation of heat retarding is that the hibernation impulse is fortified by conditions operating against it and weakened by conditions which assist. The purpose of hibernation is to render the insect inactive in adverse surroundings. Forcing is an attempt to return to activity and the inhibition resists strenuously. As a practical hint, forcing larvae and pupae of true hibernators from January onwards has given higher percentages of emergences than natural emergence. Outdoors the greatest number of fatalities occur in the early months of the year. The protective influence of hibernation is exhausted, the individual being subject to the caprices of the weather until temperature rises to the minimum necessary to recommence development. *In the case of P. napi* this is apparently 48° F. (actual, *not average*). Hibernating larvae of *Pechipogon barbalis* have been bloated with water for several weeks in early winter and then successfully reared but this is

impossible with a non-hibernating larva responsive to its environment.

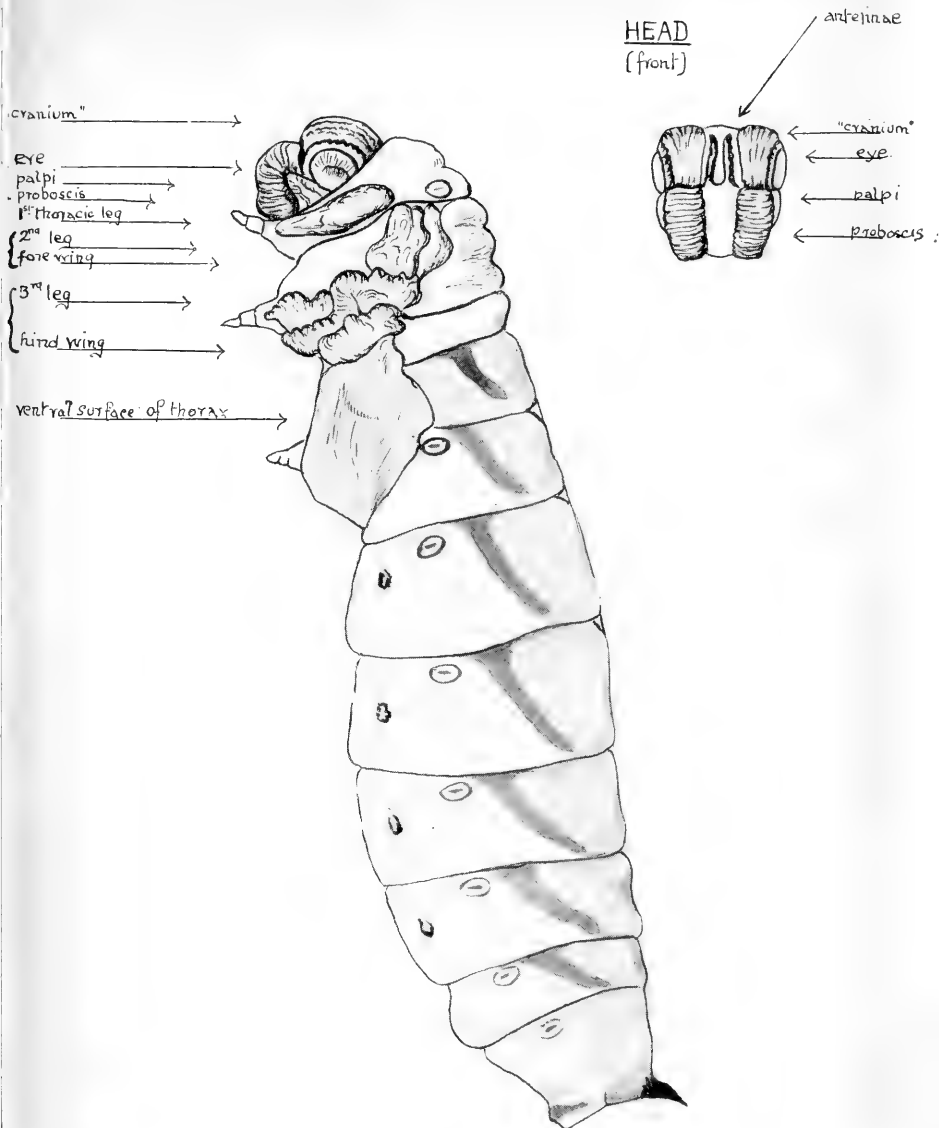
It is known that many species such as *Brenthis selene* are double brooded on the Continent but rarely so in Britain. The capricious second appearance in this country is explained by the coincidence of a hot summer. This is incorrect. Actually it is an example of Mendelian inheritance; hot weather has little to do with it. The property of hibernation is as truly Mendelian as melanic colouring. The writer has found many times—with widely divergent species of hibernators—that the progeny of one female will form two groups; the bulk carrying hibernation factors and a minority devoid of them. The latter complete their cycle without a check. They are *non hibernators* and breed true. Dissection shows no internal difference between the groups but there is good evidence that certain wing pattern factors are linked with hibernation factors. This is too large a subject for present discussion but at least it gives an explanation for the phenomena of distinctive brood colourings. Mendelian hibernation has been found in the following species:—

Pieris brassicae, *P. napi*, *P. rapae*, *Polyommatus icarus*, *Smerinthus populi*, *S. ocellatus*, *Porthesia similis*, *Dianthoecia carphophaga*, *Abrostola tripartita*.

To illustrate, here are two experiments on *Polyommatus icarus*:—

1. “From a normal female taken at Banstead on June 27th, 1939, twenty-three ova were obtained laid low down on Bird’s-foot Trefoil during the first week in July. Hatched July 10th/12th. Three larvae grew continuously and emerged about August 24th—all normal females. The remaining 20 larvae fed until the last week in July, then became sluggish and ceased feeding. They were 0.1 inches in length and obviously hibernating. Twelve were alive on October 20th. I sleeved them in a fresh pot of trefoil kept indoors in a cool room until January 10th. At this date 11 were alive, so I selected 4 and forced them at 70° in the warm cupboard. They became active in three or four days and as trefoil was unobtainable in sufficient quantity I offered soaked split peas, upon which they began to feed. All 4 grew without check and emerged on the following dates:—February 22nd, ♀. March 3, 7, 9, all ♂♂.

“These specimens were larger than their non-hibernating sisters of the previous August. This left me with 7 young larvae, which were kept in the trefoil pot at normal winter temperature. The plant sprouted at the end of February but only 2 larvae survived to commence feeding early in March. Incidentally, it will be noted that only one out of twelve died between October 20th and January 10th, while hibernating, but between January 10th and March 1st, when the hibernation impulse was exhausted, five out of seven expired. Further, the four that were forced at the expiry of the hibernation period (January 10th) all came through. In other words, the fatality rate after January 10th increased by nine times.



SPHINX LIGUSTRI (immediately before pupation) x4

Larval skin removed with forceps to show imaginal appendage buds.

" My last two larvae were allowed to feed normally and came out on May 27th and June 2nd, both ♂♂.

" It is clear from this experiment that the majority of this batch were single brooded and a pairing, probably two generations back, had introduced the continuous brooded strain.

2. " From a normal female taken at Banstead on May 18th, 1940, about forty ova were laid on trefoil. On June 28th all the larvae except one had passed half growth. Unfortunately, a number died at this time, possibly from overcrowding, but all except the one noted had passed the hibernating size. This larva remained static for two weeks, then fed slowly for a month and moulted. Its length was then 0.25 inches, but it died soon after moulting (mid September). I saved 14 of the larvae, which produced adults between July 25th and August 6th. It is interesting that several extreme ab. *coerulea* came out. As the mother was normal I surmise this is a case of transference through the father.

" We have obviously a practically pure strain of continuous *P. icarus* in this experiment. I tried to perpetuate the strain but could not obtain any pairings."

Before leaving the Mendelian aspect a brief reference must be made to *Pieris rapae*. This butterfly appears to be in an unstable condition of rapid evolution, possibly owing to an enormous increase in numbers since cabbage growing became a staple branch of agriculture. By experiment five forms have been isolated according to the duration of pupal hibernation. There is a continuous brooded type, non-hibernating, with a life cycle of 33 days at 65° F. Fortunately for gardeners this strain, which can be regarded as ancestral, seems unable to resist the winter. Then there are four types with pupae hibernating periods of 35, 70, 105, and 140 days respectively. The non-hibernating type always shows the heavy black wing tips and spots of the "summer brood," whilst the hibernators of all four classes are "spring," "summer" and intermediate in colouring.

On the biology of hibernation a great deal of work has yet to be done and it is unwise to generalize hastily, but it is possible to indicate an explanation of this suspension of the life force. A "common denominator" theory has to be formulated capable of explaining hibernation at all stages from the undifferentiated embryo (e.g. *O. antiqua*) to the sexually mature imago.

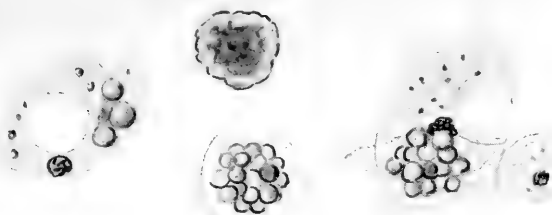
Theories dependent on external conditions such as low temperature, lack of nutrition in winter food, etc., can be quickly dismissed. "Apparent Hibernators" of normal size have been raised in heat at mid-winter on such plants as dock, chickweed, cabbage, grasses, ivy and root vegetables. Good specimens of the true hibernators, *O. potatoria* and *A. caja*, have been produced on grass and cabbage respectively when the hibernation period has exhausted itself in January. Further, it was possible to obtain ova of *N. phaeorrhoea* in March (by forcing). The larvae from these reached hibernating size early in July, and

promptly hibernated. They eventually dried up during the months of active growth in the wild state. Their hibernation was controlled from within—not without.

In searching for the physiological basis of hibernation the much abused word "instinct" comes to mind. But for the operation of an "instinct" a nervous system linked with all parts of the body is essential. Unfortunately, in the hibernating embryo of *O. antiqua* there is no differentiated nervous system and in most hibernating pupae the nervous system is *not* connected with the bulk of body tissues. There is definite contact only with the gonads, dorsal heart, and possibly the intestine. The thoracic tissues consisting of free cells are remote from nervous control. As all parts of the pupal body are equally dormant it is difficult to accept the instinct explanation. Another possibility is that hibernation is brought on by hormones or internal secretions. Acceptance of this theory at its face value presents two difficulties. Firstly, it is logical to assume that the same gland should provide the hormone at whatever stage hibernation occurs. In other words, this gland must be equifunctional in ovum, larva, pupa and imago, *including* the embryo of *O. antiqua* which is a globe of cells without distinction of tissue. There appears to be no glandular tissue of sufficient constancy throughout the various stages to satisfy this premise. Goldschmidt has stated that there are no hormones in Lepidoptera. Secondly, in the same brood we find hibernators and non-hibernators (*e.g.* *P. rapae*). Dissections of both forms in several species, larvae and pupae, fail to show any visible difference in the tissues as might be expected in the hibernators if some structure was modified for hormone secretion. Although the idea of glandular secretion does not seem feasible, a form of chemical control, whose existence is supported by experimental evidence, offers a sound explanation and satisfies the "Common Denominator."

Before describing this theory in detail it is necessary to obtain a biological picture of the curious state of flux in which pupal hibernation occurs. To avoid any possible misunderstanding a personal note may be interpolated at this stage. Every experiment, dissection, illustration and deduction is the original work of the writer. Whilst there is a great indebtedness to the bibliography, this paper is not a symposium of other men's work.

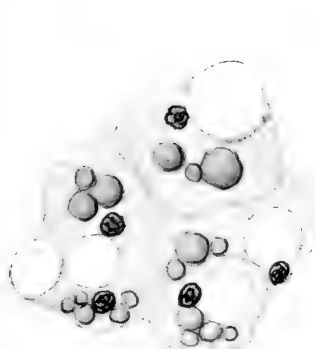
Plate II shows the "pre-pupa" of *Sphinx ligustri* obtained by removing the larval skin one hour before the natural shedding for pupation. The buds of future imaginal appendages—greatly folded membranous sacs filled with blood—are closely applied to their basis of origin and, what is of great interest, a fine investing membrane, seen clearly in the shape of larval thoracic legs, covers the whole body. This membrane, with the new appendages growing beneath it, appears to be the vestige of a lost transition stage between larva and pupa. It will be recalled that in the more primitive Orthoptera wings, etc., appear gradually over a succession of moults, but in the highly specialized Lepidoptera there is an abrupt change. The more logical view is that the



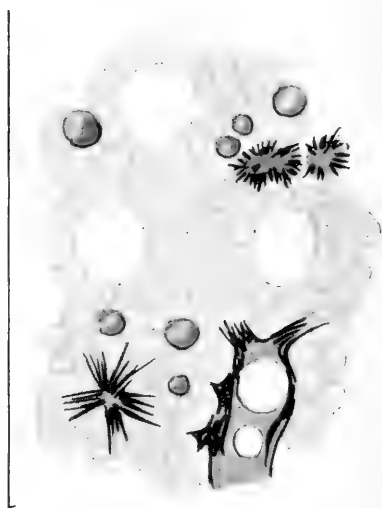
A



B



C



D

all are living preparations x600

A. PIERIS BRASSICÆ, amoeboid "brown" cells from body cavity of hibernating pupa.

B. MANIA MAURA, colourless blood cells. (mature larva)

C. D. PIERIS BRASSICÆ, stages of thoracic development (pupa) by fusion of brown cells. Note radiating chitinous nuclei in D.

intermediate stages have been telescoped by evolution into a few hours, as the evidence of their ancestral existence still persists. After the act of pupation the appendage buds are expanded to cover the front of the thorax, fitting neatly together, whilst liquid chitin is exuded between the pupal skin and investing membrane. On exposure to air through the semi-permeable membrane this is hardened into the familiar pupal sheath and all trace of membrane is lost except for a few fine bristles. Inside the body great changes have occurred. Whilst the larva is still feeding the greenish blood contains relatively few cells. These are colourless, oval and circular, 0.0015 to 0.002 inches diameter and nucleated. Many of the circular cells resemble the polymorphonuclear leucocytes in human blood. In the nearly mature larva of *Mania maura* (Plate IIIb) these cells were budding from the walls of the hind gut into the body cavity, which is filled with blood. There were a few ingested bacteria. Forty-eight hours after pupation very few corpuscles could be found and in older pupae of this and other species no corpuscles at all were detected. Coincidental with the corpuscular decline in the day or two before and after pupation there is a great influx of another cell into the blood. These are the amoeboid "brown" cells. Irregular in shape, approximately 0.002 inches in diameter, they possess pseudopodia, vacuoles, a fine cytoplasmic network, and carry small globules of golden brown oily fluid. These are the chief cells (Plate IIIa) involved in the breakdown of larval tissues and upbuilding of imaginal structures. Their origin appears to be in the vacuolated brown tissue forming the inner capsule of the gonads. Budding from here, and having also the power of division, they expand in size, ingest what appears to be fat reduced by bacterial action (see later), pass into the body cavity and thence by the circulation throughout the body. After further reducing the disintegrating larval muscles, etc., "brown cells" coalesce in the foci of the future legs, wings, and sense organs to build up the imaginal tissues (Plate IIIcd). The great importance of these cells lies in the fact that, being free moving, they still carry in their substance all the potentialities of the future perfect insect without any connection with the nervous system. In other words, they represent the organism in solution.

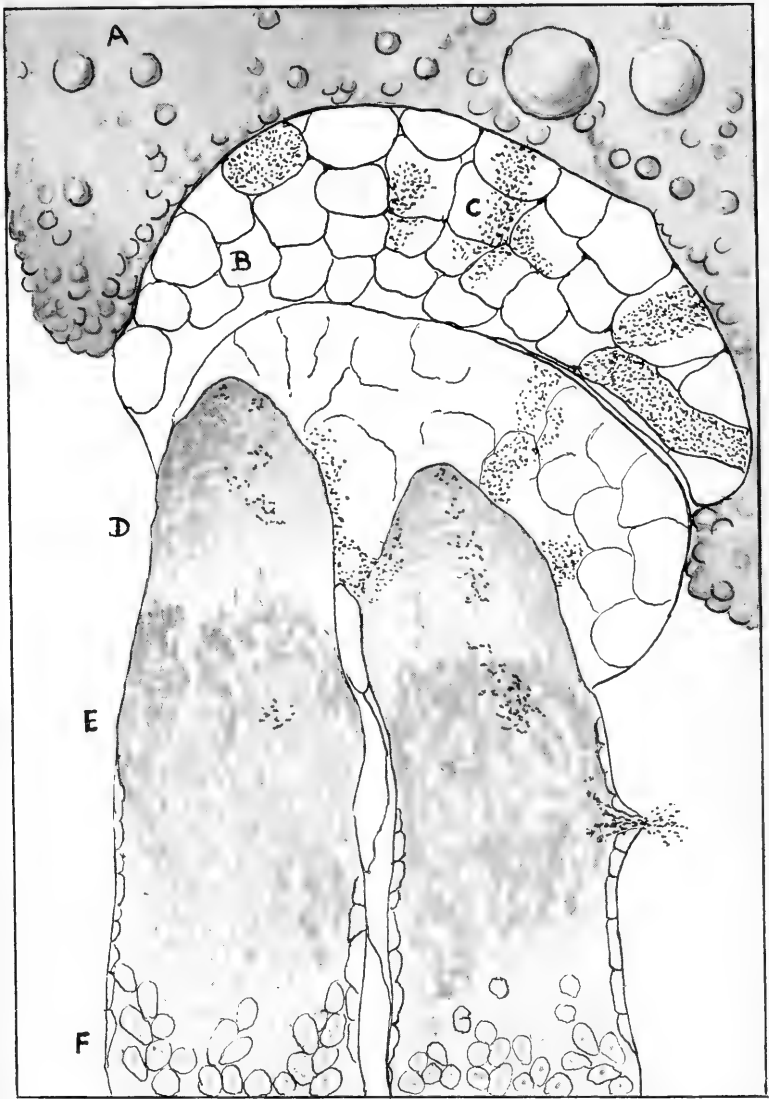
Therefore, in formulating any hibernation theory the problem of "brown cells" has to be explained as they remain inert at Stage A throughout the period. The theory must be based on the individual cell independent of central control. As hibernation is Mendelian it is axiomatic that factors are present in the fertilized ovum. At every subsequent cell division these factors pass into the new cells so that automatically every body cell is factored. Now factors for any specific feature show themselves when the particular tissues involved reach the appropriate stage of development. For example, all the body cells carry colour factors but it is only in the superficial cells of wings and body that colour can be apparent. Colour cannot be visible in the gonads but factors must be present as the following generation is simi-

larly coloured. Hibernation is specific for all cellular parts of the body as complete inactivity takes place. One tissue cannot rest at the expense of the others or the metabolic equilibrium will be upset. Suppose, for example, the original ovum receives factors from its parents which will cause hibernation immediately after the fourth larval moult. When this stage is reached the whole animal becomes inactive because of the simultaneous inertness of its components. This theory allows hibernation to take place at any period of development, being dependent only on the factor peculiar to the species. As the nature of growth is cell division it can be seen in the ultimate analysis that hibernation is the cessation of cell division by an inhibition working simultaneously in every cell. There is a parallel between insect hibernation and the spor-ing of Bacteria, the encystment of Protozoa, and the resting periods of Plants. We all are aware that bulbs remain dormant for several months in summer in spite of favourable growing conditions; that the buds of deciduous trees cannot be forced into expansion until mid-winter has passed; that some seeds such as *Primulas*, even in the presence of warmth and moisture, will not germinate for months. In all these cases the power to resist growth must reside in the individual cells as there is no central nervous control. Is there any evidence of the nature of this inhibitor? Yes, there are indications that it is bio-chemical in action.

Three sets of facts give point to the belief that there is present in the body tissues, including the blood, of the freshly hibernated insect a substance which paralyses the action of all cells submitted to it. This substance, reminiscent of the sleep producing cerebrosin of higher animals, may be formed in every cell of the hibernator at the requisite period or certain tissues only may secrete it. In either case the result is the same. Carried throughout the body by the blood stream every cell is reached and paralysed.

Firstly, if the dorsal portion of a hibernating pupa is cut away it will be found that the heart is hardly pulsing, but if this heart is removed, washed and mounted in isotonic saline a rapid pulse sets in. Two instances of *P. brassicae* treated in this way showed pulses of 57 and 25 per minute. An inhibition has been removed and the stimulus of the salt has accelerated the beat.

Secondly, a large number of *P. rapae* larvae were collected in August and September 1940 from the garden and allowed to pupate, the object being to grade them into the four hibernation groups already described. A fair number were stung by one particular Dipterous parasite. Some of the butterflies emerged in six to seven weeks, corresponding to the first hibernation group (35 days hibernation plus 11 days development), and it was noted that from several other pupae Dipterous larvae broke out at the same time and pupated, the flies under forcing emerging three weeks later. There were no further parasites until the last group was reached (hibernation 140 days) when some more pupae died and produced parasite larvae which again developed into flies after a further



PIERIS RAPÆ x300. Living preparation of proximal portion of two branches of the ovary in a developing pupa

- | | |
|-----------------------------|------------------------------------|
| A fat body. | D "brown" granular tissue |
| B. zone of broken-down fat. | E "purple" granular tissue |
| C. bacteria in motion("A") | F developing ova & follicle cells. |

f

three weeks. One is inclined to believe that in the body of the host pupa was a substance inhibiting the development of the parasite, the amount of the inhibitor being governed by the number of hibernation factors present, that the substance is secreted at the time of hibernation and for a week or so afterwards and that it gradually decomposes and when all trace has disappeared normal growth can be resumed.

The third and most important set of facts concerns the symbiotic organisms present in Lepidoptera, other Insects and certain related Achordates. There is no space for a full description but some details are essential. Two principal organisms, "*Bacterium A*" and "*Bacterium B*," are concerned. They are either Micrococci or excessively minute Protozoans. Both are always present in vast numbers in all individuals of all species of Lepidoptera examined, from widely separated localities at all stages of growth. There is no question of their universal and essential presence. Both are transmitted from generation to generation through the medium of the ova, whilst "*A*" has been detected many times in Lepidopteran sperms. They can be cultured externally. Broth cultures of these organisms do not putrefy when exposed to the air. Foreign bacteria fail to grow and the cultures can be air dried in a warm cupboard and remain odourless. Gelatine cultures are liquefied and on boiling with alkali give off a small amount of ammonia. This is what happens in dead Lepidoptera. It has been noticed that insects do not smell foully after death although they contain a considerable amount of animal tissue. What happens is that their own symbiotic organisms break down the tissues in this peculiar odourless fashion whilst the usual bacteria of decay never get a foothold.

Bacterium "A" is found in astronomical numbers in the walls of the Gonads and near the fat body. It is a slightly flattened oval 0.8μ in length and in liquid has a gyrotory motion. Plate IV is an accurate drawing of these bacteria in association with the ovary and fat body. They appear to carry out the essential function of reducing the fat to a condition suitable for assimilation by the body cells. In passing, mention should be made of the "*Brown*" and "*Purple*" tissues on Plate IV. These consist of colourless cells surrounded by masses of granules, brown at the tip of the ovary and deep purple as an outer layer further down. In the testes there is a purple outer layer and brown inner capsule. Purple is characteristic of the *Pieridae* but other families possess yellow or orange tissue so that this substance, which may have an excretory function, is possibly an anthraquinone derivative of the Flavopurpurin family.

Bacterium "B," length 2.5μ , very slightly oval and capable of slow motion, is chiefly found in mass in the excretory tubules. Both A and B can survive adverse conditions by sporing, when they form a spherical capsule.

The relation of these organisms to hibernation is important. In normal growth of the insect the rate of reproduction of bacteria and their

symbiotic activity are closely regulated to the host. If they become out of hand the host will be eaten up. During hibernation when the host's metabolism is quiescent the bacteria are also inert. As there can be no physical connection between the bacterium and its host it is clear that a substance in solution must be the inhibitor.

If the existence of the bio-chemical inhibitor secreted by individual cells is accepted the behaviour of freshly hibernated *P. brassicae* pupae under the action of heat is explicable. It will be recalled that temperatures of 70° F. applied continuously from the moment of hibernation greatly lengthen the hibernation period. Warming the cells increases their activity and correspondingly their rate of secretion. More inhibitor is produced; this takes longer to break down and hence the dormant condition persists beyond the normal time. Cold at the moment of pupation will have the reverse effect—there will be less inhibitor and a shorter period. This theory, then, is offered as an explanation of hibernation. It is the writer's hope that it may form a basis for others to work from, as it is only by the accumulated weight of evidence that it can be thoroughly proved.

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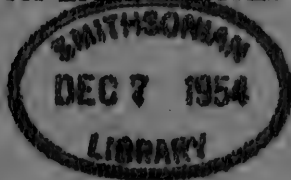
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1941-42

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1888-9	T. R. BILLUPS, F.E.S. (dec.).	1930	C. N. HAWKINS, F.E.S.
1890	J. T. CARRINGTON, F.L.S. (dec.).	1931	K. G. BLAIR, D.Sc., F.E.S., F.Z.S.
1891	W. H. TUGWELL, Ph.C. (dec.).	1932	T. H. L. GROSVENOR, F.E.S.
1892	C. G. BARRETT, F.E.S. (dec.).	1933	C. G. M. DE WORMS, M.A., Ph.D., A.I.C., F.C.S., F.R.E.S., M.B.O.U.
1893	J. J. WEIR, F.L.S., etc. (dec.).	1934	T. R. EAGLES.
1894	E. STEP, F.L.S. (dec.).	1935	E. E. SYMS, F.R.E.S.
1895	T. W. HALL, F.E.S. (dec.).	1936	M. NIBLETT.
1896	R. SOUTH, F.E.S. (dec.).	1937	F. J. COULSON.
1897	R. ADKIN, F.E.S. (dec.).	1938	F. STANLEY-SMITH, F.R.E.S.
1898	J. W. TUTT, F.E.S. (dec.).	1939	H. B. WILLIAMS, LL.D., F.R.E.S.
1899	A. HARRISON, F.L.S. (dec.).	1940	E. A. COCKAYNE, D.M., A.M., F.R.C.P., F.R.E.S.
1900	W. J. LUCAS, B.A., F.E.S. (dec.).	1941	F. D. COOTE, F.R.E.S.
1901	H. S. FREMLIN, F.E.S., etc.		
1902	F. NOAD CLARK.		
1903	E. STEP, F.L.S. (dec.).		
1904	A. SICH, F.E.S.		
1905	H. MAIN, B.Sc., F.E.S.		
1906-7	R. ADKIN, F.E.S. (dec.).		
1908-9	A. SICH, F.E.S.		

LIST OF MEMBERS.

(Revised to 21.5.42.)

Chief subjects of Study:—*b*, Botany; *c*, Coleoptera; *cr*, Crustacea; *d*, Diptera; *ec. ent*, Economic Entomology; *ent*, Entomology, General; *e*, Exotic; *hem*, Hemiptera; *hym*, Hymenoptera; *l*, Lepidoptera; *mi*, Microscopy; *mo*, Mollusca; *n*, Neuroptera; *nat. phot*, Nature Photography; *oo*, Oology; *orn*, Ornithology; *orth*, Orthoptera; *od*, Odonata; *r*, Reptiles; *t*, Trichoptera.

A.F.—Serving with the Armed Forces.

HONORARY MEMBERS.

DATE OF ELECTION.	DATE OF JOINING.	
14.3.1912.	14.3.1912.	POULTON, Prof. Sir EDWARD B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., “Wykeham House,” Oxford.
10.1.1935.	12.5.1887.	TURNER, Hy. J., F.R.E.S., F.R.H.S. (<i>Hon.</i> <i>Editor</i>), “Latemar,” 25, West Drive, Cheam, Surrey.
14.8.1941.	4.2.1886.	FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., “Heavers,” Ryarsh, Kent.
10.1.1942.	10.1.1924.	CHAPMAN, Miss L. M., “Arolla,” Waterloo Road, Reigate, Surrey.

LIFE, FULL, AND COUNTRY MEMBERS.

YEAR OF
ELECTION.

1937	ADAMS, R. W., 16, Kenton Gardens, Kenton, Middlesex. <i>l</i> .
1886	ADKIN, B. W., F.R.E.S., “Highfield,” Pembury, Tunbridge Wells, Kent. <i>l, orn</i> .
1941	ADKIN, GUY T., South Cottage, Saint Mawes, Cornwall. <i>l</i> .
1922	ADKIN, J. H., <i>Hon. Lanternist and Council</i> , “Lamorran,” Oak Lane, Sevenoaks, Kent. <i>l</i> .
1907	ANDREWS, H. W., F.R.E.S., 6, Footscray Road, Eltham, London, S.E.9. <i>d</i> .
1895	ASHBY, S. R., F.R.E.S., <i>Hon. Curator</i> , 37, Hide Road, Headstone, Harrow, Middlesex. <i>c, l</i> .
1934	ATKINSON, J. L., “Down’s Cottage,” 76, Northwood Road, Tan- kerton, Kent. <i>l</i> .
1936	AUGUST, V. E., 59, Hillcross Avenue, Morden, Surrey. <i>ent</i> .
1939	BAKER, D. B., 17, Florence Park, Bristol, 6, Glos. <i>l, c</i> .
1937	BALLINGER, D. E., “The Cottage,” Canham Road, Acton, Lon- don, W.3. <i>l, A.F.</i>
1896	BARNETT, T. L., 31, Littleheath Road, Selsdon, Surrey. <i>l</i> .

YEAR OF
ELECTION.

- 1933 BAYNES, Capt. E. S. A., F.R.E.S., "Monkshatch Cottage," Compton, near Guildford, Surrey. *l*.
- 1927 BEDWELL, E. C., F.R.E.S., "Deccan," Epsom Road, Merrow, Guildford, Surrey. *c, hem*.
- 1938 BEIRNE, B. P., PH.D., F.R.E.S., F.L.S., 4, Tobernea Terrace, Monkstown, Co. Dublin, Eire. *micro-l*.
- 1929 BELL, J. H., Dudswell Rise, Northchurch, Berkhamstead, Herts.
- 1911 BLAIR, K. G., D.S.C., F.R.E.S., *Council*, 11, Durrington Park Road, Wimbledon, London, S.W.20. *n, c*.
- 1926 BLISS, A., *Council*, 4, Monahan Avenue, Purley, Surrey. *l*.
- 1941 BLOOD, B. N., L.R.C.S.I., 25, Spencer Gardens, Eltham, London, S.E.9. *hym*.
- 1925 BLYTH, S. F. P., "Cleaveland," Chislehurst. Kent. *l*.
- 1934 BORRER, C. D., "The Old Manor House," Cley-next-Sea, Norfolk. *ent*.
- 1939 BOWES, Pilot Officer A. J. L., R.A.F., V.R., 15, Queen's Gardens, Herne Bay, Kent. *l. A.F.*
- 1935 BOWLES, T. J.
- 1933 BRETT, G. A., B.Sc., A.R.C.S., D.I.C., Scale-Hayne Agricultural College, Newton Abbot, S. Devon. *ent*.
- 1935 BRETT, Mrs KATHLEEN S. L. F., 2, Old Claygate Lane, Hinchley Wood, Esher, Surrey. *biology*.
- 1940 BRITTEN, H., "Newholme," 21, Toller's Lane, Old Coulsdon, Surrey. *ent (Chalcididae)*.
- 1930 BROOKE, Miss W. M. A., 300, Philip Lane, London, N.15 *ec. ent, b, marine life*.
- 1939 BROWN, A. G., L.D.S., R.C.S.ENG., 17, The Vale, Golders Green, London, N.W.11. *l. A.F.*
- 1938 BROWN, S. HAMILTON, L.D.S., R.C.S.ENG., Flat 2, 67, Saddler Street, Durham City. *l. A.F.*
- 1936 BUCK, F. D., 49, Elthorne Road, Holloway Road, London, N.19. *c. A.F.*
- 1938 BUCKLEY, W., F.R.E.S., M.I.GAS E., 5, Westfield Road, Cheadle Hulme, Cheshire. *l*.
- 1909 BUCKSTONE, A. A. W., 90, Pains Way, Kingston Road, Ewell, Surrey. *l*.
- 1927 BULL, G. V., B.A., M.B., "White Gables," Sandhurst, Kent. *l*.
- 1938 BURTON, Miss MARGARET, "Newlands," 212, Golders Green Road, London, N.W.11. *biology*.
- 1938 BURTON, R. J., L.D.S., R.C.S.ENG., "Newlands," 212, Golders Green Road, London, N.W.11. *l*.
- 1922 BUSHBY, L. C., F.R.E.S., 33c, Regent's Park Road, London, N.W.1. *c, hem*.
- 1937 CARDEW, Col. P. A., c/o Mrs Wilkinson, Moor Road, Croston, Lancs. *l. A.F.*
- 1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs. *l, n*.

YEAR OF
ELECTION.

- 1936 CHARTRES, S. A., F.R.E.S., 9, King's Drive, Eastbourne, Sussex.
ent.
- 1922 CHEESEMAN, C. J., 26, Lyndhurst Road, Birkdale, Southport,
Lancs. *l.*
- 1936 CLASSEY, E. W., F.R.E.S., R.A.M.C., 46, Grange Cottages, College
Road, Ash, Surrey. *l. A.F.*
- 1915 COCKAYNE, E. A., D.M., F.R.C.P., F.R.E.S., *Council*, "Merstone,"
Tring, Herts. *l.*
- 1934 COLE, G. A., M.A., A.C.A., Ministry of Pensions, Howard Build-
ings, Howard Street, Belfast. *l.*
- 1935 COLLINS, R. J., "Appledore," Mugswell, Chipstead, Surrey. *l.*
- 1899 COLTHRUP, C. W., "Dehra Doon," Tite Hill, Englefield Green,
Surrey. *l, oo, orn.*
- 1938 CONDER, G. M., M.R.C.S., L.R.C.P., L.D.S., 33, Grove Avenue,
Sutton, Surrey. *l. A.F.*
- 1936 COOPER, B. A., B.S.C., A.R.C.S., Dept. of Agriculture, The Univer-
sity, Leeds, 2. *ent. (Life Member.)*
- 1907 COOTE, F. D., F.R.E.S., *Vice-President*, 32, Wickham Avenue,
Cheam, Surrey. *l, b.*
- 1923 CORK, C. H., 11, Redesdale Street, Chelsea, London, S.W.3. *l.*
- 1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common,
London, S.E.18. *l, c.*
- 1922 COUCHMAN, L. E., c/o Mrs A. Couchman, 82, Newbury Road,
Bromley, Kent. *l.*
- 1909 COULSON, F. J., *Council*, "Burnigill," 24, Springfield Avenue,
Merton Park, London, S.W.20. *c, hem.*
- 1918 COURT, T. H., "Oakleigh," Market Rasen, Lincoln.
- 1937 CRABTREE, B. H., F.R.E.S., "Highfield," Alderley Edge, Cheshire. *l.*
- 1935 CRASKE, E. S., "Hillsboro," Gringer Hill, Maidenhead, Berks. *l.*
- 1934 CRASKE, J. C. B., F.R.E.S., 7, Tillingbourne Road, Shalford, near
Guildford, Surrey. *l.*
- 1937 CRASKE, Major R. M., Royal Artillery, Newcome Barracks, Lark-
hill, Wilts. *ent, A.F.*
- 1918 CRAUFURD, CLIFFORD, "Denny," Bishops Stortford, Herts. *l.*
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, North-
wich, Cheshire. *l.*
- 1920 CROCKER, Capt. W., 55, Townley Road, Bexleyheath, Kent. *l.*
- 1932 CROW, P. N., "Heathcote," Bigfrith, Cookham Dean, Berk-
shire. *l. A.F.*
- 1937 CURTIS, A. E., "The Cottage," Ifold Estate, Loxwood, Billings-
hurst, Sussex. *l.*
- 1927 DANBY, G. C., "Sheringham," 31, Albion Road, Sutton,
Surrey. *l.*
- 1938 DAVIES, O. C., 33, Hopton Road, Streatham, London, S.W.16. *l.*
A.F.
- 1940 DAVIS, G. A., 76, Station Road, Chingford, London, E.4. *c. A.F.*

YEAR OF
ELECTION.

- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l, c.*
- 1938 DEAL, JAMES, 18, Manor Road, West Wickham, Kent. *l.*
- 1933 DEMUTH, R. P., Manor Farm, Compton Greenfield, near Bristol, Gloster. *l.*
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, London, S.W.1. *l, mi, b, nat. phot.*
- 1930 DENVIL, H. G., *Hon. Secretary and Vice-President*, 4, Warwick Road, Coulsdon, Surrey. *l, c.*
- 1901 DODS, A. W., 35, The Mall, Southgate, London, N.14. *l.*
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading, Berks. *l.*
- 1939 DOUBLEDAY, B. S., F.R.E.S., 325, Banbury Road, Oxford. *Chalcidoidea.*
- 1936 DOUDNEY, S. P., *Council*, "Thurne," 110, Foxley Lane, Purley, Surrey. *l.*
- 1938 DOWN, C., 7, Mersham Drive, Kingsbury, London, N.W.9. *ent.*
- 1930 DOWNES, J. A., B.Sc., F.R.E.S., Zoology Dept., The University, Glasgow. *ent, l.*
- 1930 DUDBRIDGE, B. J., B.A., Colonial Administrative Service, Tanganyika, c/o The Secretariat, Dar-es-Salaam; and 13, Church Lane, Merton Park, London, S.W.19. *ent.*
- 1927 EAGLES, T. R., *Hon. Treasurer*, 32, Abbey Road, Enfield, Middlesex. *l, c.*
- 1937 EASTON, N. T., 214, Worcester Road, Droitwich Spa, Worcestershire. *l.*
- 1941 EDWARDS, Rev. Canon T. G., Holy Trinity Vicarage, Tulse Hill, London, S.W.2. *l.*
- 1933 ELGOOD, W. S., North Brink, Wisbech, Cambs. *l.*
- 1923 ELLIS, H. WILLOUGHBY, F.R.E.S., F.Z.S., M.B.O.U., Friary Hill, Weybridge, Surrey. *c, orn.*
- 1937 EMBRY, B., F.R.E.S., 23, Mill Drove, Uckfield, Sussex. *l. A.F.*
- 1932 ENNIS, L. H., c/o "Bandora," Portmore Park Road, Weybridge, Surrey. *l. A.F.*
- 1935 ENSOR, G. A., "Oakleigh," Knoll Road, Dorking, Surrey. *l and hym.*
- 1920 FARMER, J. B., "Ashleigh," Beatrice Road, Oxted, Surrey. *l, c.*
- 1924 FASSNIDGE, WM., M.A., F.R.E.S., 13, Commercial Road, Parkstone, Dorset. *l, v, hem.*
- 1930 FERRIER, W. J., F.R.E.S., 86, Portnalls Road, Coulsdon, Surrey. *l, A.F.*
- 1936 FINNIGAN, W. J., *Council*, 87, Wickham Avenue, Cheam, Surrey. *ent, nat. phot.*
- 1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*
- 1920 FORD, L. T., Elms Hotel, Bare, Morecambe, Lancs. *l.*
- 1941 FORD, R. L. E., F.R.E.S., "Durfold," 34, Park Hill Road, Bexley, Kent. *ent.*

YEAR OF
ELECTION.

- 1939 FORSTER, H. W., 76, Station Road, Chingford, London, E.4. *c.*
- 1915 FOSTER, T. B., "Downlands," 24, York Road, Selsdon, Surrey. *l.*
- 1933 FRASER, ANGUS, The Palace, Cuddesdon, Oxford. *c.*
- 1912 FROHAWK, F. W., M.B.O.U., 43, Aston Street, Oxford. *l, orn.*
- 1930 GILLIAT, F. T., B.A., F.R.E.S., Two Brewers Inn, Chipperfield, Herts. *l.*
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l.*
- 1936 GOODBAN, B. S., 5, Harlyn Drive, Pinner, Middlesex. *l.*
- 1935 GOODLIFFE, F. D., Lord Wandsworth Agricultural College, Long Sutton, Basingstoke. *ec. ent.*
- 1926 GORDON, D. J., B.A., F.R.E.S., "Craigellachie House," Strathpeffer, Ross. *c, l.*
- 1936 GOWING-SCOPES, E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l.*
- 1924 GRANT, F. T., 37, Old Road West, Gravesend, Kent. *l, c.*
- 1924 GREER, T., J.P., "The Bungalow," Sandholes, Dungannon, Co. Tyrone. *l.*
- 1926 GREY, Mrs OLIVE, F.Z.S., 66, Barrington Court, Pages' Hill, London, N.10. *ent.*
- 1934 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe, Croydon, Surrey. *b.*
- 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfield Road, Oxford. *l.*
- 1902 HARE, E. J., F.R.E.S., Harrow Place, Pinden, Dartford, Kent. *l.*
- 1937 HARRIS, H. G., M.D., B.S. (DURHAM), 5, Archer's Road, Southampton, Hants. *l.*
- 1936 HARRIS, W. H. A., 48, Corringway, London, W.5. *l.*
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road, Winton, Bournemouth, Hants. *l.*
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, London, S.W.2. *l.*
- 1924 HAWKINS, C. N., F.R.E.S., *Council*, 23, Wilton Crescent, Wimbledon, London, S.W.19. *l.*
- 1929 HAWLEY, Lt.-Col. W. G. B., D.S.O., "Amber Cottage," Bodenham, near Salisbury, Wilts.
- 1938 HAYNES, R. F., "The Sanctuary," Burney Road, West Humble, Dorking, Surrey. *l. A.F.*
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental Agricola, Casilla Correo 71, Tucuman, Argentina. *l, orn, c.*
- 1935 HEDGES, A. V., F.R.E.S., "Ballovale," Santon, Isle of Man. *l.*
- 1920 HEMMING, Capt. A. F., C.M.G., C.B.E., F.Z.S., F.R.E.S., Office of the Regional Commissioner for the Southern Region, "Marlborough House," Parkside Road, Reading, Berks, or *c/o* Ministry of Home Security, Whitehall. *l.*
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c. A.F.*

YEAR OF
ELECTION.

- 1931 HESLOP, I. R. P., M.A., F.R.E.S., c/o Messrs Griffiths and McAlister, 10, Warwick Street, Regent Street, London, W.1. *l.*
- 1927 HEWER, H. R., M.Sc., D.I.C., Ministry of Food, Imperial Hotel, Colwyn Bay, N. Wales (Mark envelope Personal).
- 1937 HICK, E. PENTLAND, F.R.E.S., "Athol House," Fulford Road, Scarborough, Yorks. *l. A.F.*
- 1927 HOWARD, P./O. J. O. T., M.A., R.A.F.V.R., c/o Barclays Bank Ltd., 161, New Bond Street, London, W.1. *l. A.F.*
- 1931 HOWARTH, T. G., B.E.M., F.R.E.S., 77, Woodland Rise, Muswell Hill, London, N.10. *l. A.F.*
- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea, Essex. *l. ent.*
- 1929 HUGHES, ARNOLD W., Lower Farm, Quainton, Bucks. *l.*
- 1939 HULLS, L. G., F.C.S., F.R.M.S., F.R.E.S., "Rax," Chidham, near Chichester, Sussex. *ent.*
- 1938 HUMPHREYS, J. A., c/o W. H. A. Harris, Esq., 48, Corringway, London, W.5. *l.*
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l.*
- 1928 JACKSON, F. W. J., "The Pines," Ashted, Surrey.
- 1940 JACKSON, Capt. REGINALD A., R.N., F.R.E.S., *Council*, "The Hermitage," Bishops Waltham, Hants, and The Junior United Services Club, London, S.W.1. *ent. l. A.F.*
- 1923 JACOBS, S. N. A., "Ditchling," 54, Hayes Lane, Bromley, Kent. *l, e l.*
- 1924 JAMES, A. R., 147a, Aldersgate Street, London, E.C.1. *l.*
- 1924 JAMES, RUSSELL, F.R.E.S., 147a, Aldersgate Street, London, E.C.1. *l.*
- 1936 JAMES, L/Bdr. W. H., 390th S.L. Battery R.A., A.P.O. 725. *l. A.F.*
- 1928 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, London, N.8. *ent.*
- 1925 JARVIS, C. McK., 68, Clyfford Road, West End Road, Ruislip, Middlesex. *c.*
- 1938 JARVIS, F. V. L., B.Sc., 21, Shirley Avenue, Sutton, Surrey.
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea, Hants. *l.*
- 1928 KETTLEWELL, H. B. D., M.A., M.B., B.CHIR., M.R.C.S., L.R.C.P., F.R.E.S., "Homefield," The Common, Cranleigh, Surrey. *l.*
- 1910 KIDNER, A. R., "Starfell," Southdown Road, Seaford, Sussex. *l.*
- 1925 KIMMINS, D. E., 3, Avington Grove, Penge, London, S.E.20. *l.*
- 1933 KING, H., D.Sc., F.R.S., "Gavarnie," Wise Lane, Mill Hill, London, N.W.7. *l. orn.*
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, London, S.W.3.
- 1941 LAST, H. R., 12, Winkworth Road, Banstead, Surrey. *c, l.*

YEAR OF
ELECTION.

- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l*.
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l*.
- 1934 LINE, H. V., 11, Priory Avenue, Petts Wood, Orpington, Kent. *l*.
- 1933 LIPSCOMB, Capt. C. G., Misterton, Somerset. *l*. *A.F.*
- 1937 LISNEY, A. A., M.A., M.B., F.R.E.S., The Red House, Narborough, Leicester. *l*.
- 1935 LOWE, Major J. H. B., R.E., c/o Iloyds Bank Ltd., Cox's & King's Branch, 6, Pall Mall, London, S.W.1. *l*. *A.F.*
- 1931 MACNULTY, B. J., "Rutland," 67, All Saints Road, Sutton, Surrey. *l*. *A.F.*
- 1892 MAIN, H., B.SC., F.R.E.S., F.Z.S., The Summer House, 65, Prior Park Road, Bath, Somerset. *l*, *nat. phot*, *c*.
- 1889 MANSBRIDGE, W., M.SC., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool, Lancs. *l*, *c*, *etc*.
- 1932 MARCON, Rev. J. N., Christ Church Vicarage, Seaside Road, Eastbourne, Sussex. *l*.
- 1930 MARSH, D. G., Quince Tree Cottage, Bolney, Sussex. *l*.
- 1922 MASSEE, A. M., D.SC., F.R.E.S., East Malling Research Station, Kent. *l*.
- 1932 MELLOWS, W. T., M.B.E., LL.B., "The Vineyard," Minster Precincts, Peterborough, Northants. *l*.
- 1938 MINNION, W. E., 57, Lloyd Court, Pinner, Middlesex. *l*. *A.F.*
- 1889 MOORE, H., F.R.E.S., 9 Hoopwick Street, Deptford, London, S.E.8. *l*, *hem*, *d*, *e l*, *e hym*, *e d*, *mi*.
- 1920 MORISON, G. D., B.SC., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen, N.B. *ec. ent*.
- 1930 MORLEY, A. McD., County Education Office, Springfield, Maidstone, Kent.
- 1937 MORTIMER, D. A., 20, Merridale Lane, Wolverhampton, Staffs. *hym*.
- 1937 MOWBRAY, M. J., 80, Woodlands Avenue, Wanstead, London, E.11. *ent*. *A.F.*
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey. *ent*.
- 1934 MUSGRAVE, A. J., B.SC., A.R.C.S., c/o Barclays Bank Ltd., 41, Broadway, London, W.13. *ent*. *A.F.*
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l*.
- 1930 NIBLETT, M., 10, Greenway, Wallington, Surrey. *galls*.
- 1938 ODD, D. A., 11, Wickham Avenue, Cheam, Surrey. *l*.
- 1932 O'FARRELL, A. F., B.SC., A.R.C.S., F.R.E.S., "Oaklands," Crawley, Sussex. *od*, *cr*, *ent*.
- 1934 OLIVER, G. B., Harefield Road, Luton, Beds. *l*.
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, London, S.E.3. *l*.
- 1940 PAYNE, L. G., Council, 22, Marksbury Avenue, Richmond, Surrey. *c*.

YEAR OF
ELECTION.

- 1940 PAYNE, R. M., 22, Marksbury Avenue, Richmond, Surrey. *c.*
- 1940 PEARSON, Miss B. M., 20, Merridale Lane, Wolverhampton, Staffs.
ent.
- 1940 PELHAM-CLINTON, 2nd Lieut. EDWARD C., R.A., Trebles Holford,
Bishops Lydeard, near Taunton, Somerset. *l. A.F.*
- 1928 PERKINS, J. F., B.Sc., F.R.E.S., 4, Thurston Road, Newton Abbot,
S. Devon. *hym.*
- 1933 PEYTON, A. G., 18, Manor Square, Stafford. *l.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, London, E.4.
od, l.
- 1924 PRIEST, C. G., 5, Kensal Road, Paddington, London, W.10. *l.*
- 1903 PRISKE, R. A. R., F.R.E.S., 37, Holway Road, Taunton, Somerset.
l, mo.
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Link-
field Lane, Redhill, Surrey. *l.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middle-
sex. *l.*
- 1936 RICHARDSON, N. A., Chadwell Farm, Stoke Hammond, Bletchley,
Bucks. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Sur-
rey. *ent. (Life Member.)*
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon,
London, S.W.20. *l.*
- 1939 RIPPON, C., M.A., J.P., F.R.E.S., "Red Lodge," Cold Ash, Newbury,
Berks. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough,
Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark, Notts.
l, n.
- 1935 ROYFFE, D. W., 99, Hughenden Road, High Wycombe, Bucks. *l.*
A.F.
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading, Berks. *l.*
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., "Windy Walls," Gatehouse
of Fleet, S.W. Scotland. *l.*
- 1915 RUSSELL, S. G. CASTLE, "Springetts," Seaview Road, Highcliffe-
on-Sea, Hants. *l.*
- 1908 ST AUBYN, Capt. J. G., F.R.P.S., 14, Purley Knoll, Purley, Sur-
rey.
- 1927 SCOTT, Col. E., M.B., "Hayesbank," Ashford, Kent. *l. A.F.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Ralli Bros., Ltd., Calcutta.
(Life Member.) l.
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough, Northants. *l.*
- 1910 SHELTON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1938 SHERRIN, W. R., A.L.S., F.Z.S., South London Botanical Institute,
323, Norwood Road, Herne Hill, London, S.E.24 *c, l.*
- 1898 SICH, ALF., F.R.E.S., 15, Norland Square Mansions, Holland Park
Avenue, London, W.11. *l.*

YEAR OF
ELECTION.

- 1939 SIVITER-SMITH, P., "Squirrels," Little Aston Park, Streetly, Staffs. *l.*
- 1921 SMART, Major H. D., R.A.M.C., M.D., D.Sc., F.R.E.S., 172, High Road, Salway Hill, Woodford Green, Essex. *l.*
- 1941 SMITH, Lieut. FDK. WM., R.N.V.R., High Mains, Closeburn, Dumfriesshire. *l, hym. A.F.*
- 1939 SMITH, S. GORDON, F.L.S., F.R.E.S., "Estyn," Boughton, Chester. *ent.*
- 1938 SNELL, B. B., "Woodsome," Bromborough, Cheshire. *l.*
- 1941 SPARROW, R. W., 134, Regents Park Road, London, N.3. *l.*
- 1908 SPERRING, C. W., 85, The Manorway, Blackheath, London, S E.3. *l.*
- 1938 STAFFORD, A. E., "Corydonis," 83, Colborne Way, Worcester Park, Surrey. *l.*
- 1927 STANLEY-SMITH, F., F.R.E.S., *Hon. Secretary*, "Hatch House," Pilgrims' Hatch, near Brentwood, Essex. *l.*
- 1928 STANLEY-SMITH, Mrs MAUD, *Council*, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1937 STEDALL, H. P. P., "Cherry Cottage," Prestwood, Great Missenden, Bucks. *ent.*
- 1940 STEEL, W. O., 16, Upsdell Avenue, Palmers Green, London, N.13. *c.*
- 1935 STEPHENS, J. A., 44, Mount Road, Chatham, Kent. *c.*
- 1938 STERLING, D. H., "Rose Cottage," Ballinger Bottom, Missenden, Bucks. *l. A.F.*
- 1936 STIGANT, Miss B., 22, Brock Street, Bath, Somerset. *hortic. ent.*
- 1924 STOREY, W. H., c/o Barclays Bank, High Street, Shoreditch, London, E.1. *ent. A.F.*
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., Mount Pleasant, Pirton Road, Hitchin, Herts.
- 1929 STUBBS, G. C., Survey Office, Kuala Lumpur, Federated States of Malay.
- 1939 SUMMERS, E. J., 33, Cumnor Road, Sutton, Surrey. *c, hem.*
- 1934 SUTTON, G. R., 35, Bold Street, Southport, Lancs. *l, c.*
- 1916 SYMS, E. E., F.R.E.S., F.Z.S., *Hon. Librarian*, 16, Selby Avenue, St Albans, Herts. *n, orth, od, t.*
- 1922 TAMS, W. H. T., F.R.E.S., 20, Rancrough Avenue, Fulham, London, S.W.6. *l.*
- 1913 TACHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1941 TAYLOR, H. G. W., 11, Granville Road, Sidcup, Kent. *col.*
- 1934 TAYLOR, J. O., 176, Petts Wood Road, Petts Wood, Kent. *l.*
- 1925 TAYLOR, J. SNEYD, M.A., F.R.E.S., P.O. Box 45, Graaff-Reinet, Cape Province, Union of S.A. *l.*
- 1938 TETLEY, J., "White Cottage," Silverlea Gardens, Horley, Surrey. *ent.*
- 1935 TOMPKINS, F. H., "Clifton," 18, Forest Side, Worcester Park, Surrey. *ent.*

YEAR OF
ELECTION.

- 1937 TONGE, A. E., F.R.E.S., "Ashville," Trafford Road, Alderley Edge, Cheshire. *l.*
- 1934 TUNSTALL, H. G., 11, St James Avenue, Ewell, Surrey. *l.*
- 1940 TURNER, A. D., 19, Wychwood Close, Canon's Park, Middlesex. *ent.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. CHAS., 9, Priory Road, Hook Road, Surbiton, Surrey. *l.*
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 7, Parkside Gardens, Wimbledon, London. S.W.19. *l.*
- 1930 WAKELY, S., *President*, 17, Warminster Road, S. Norwood, London, S.E.25. *l.*
- 1935 WALLIS-NORTON, S. G., O.i/c. Det. 20 S.T. (207) Coy., R.A.S.C., Lynn Farm, Haven Street, near Wootton, I.O.W. (*Life Member.*) *ent. A.F.*
- 1936 WARRIER, R. E., "Birchwood," Birchwood Park Avenue, Swanley, Kent. *l.*
- 1939 WATKINS, NORMAN A., M.A., F.R.E.S., R.N.V.R., 7 Bentinck Street, London, W.1. *l. A.F.*
- 1920 WATSON, D., "Crossways," Hightown, Ringwood, Hants. *l.*
- 1928 WELLS, CLIFFORD, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., "Linden House Hotel," 9 College Road, Epsom, Surrey. *l.*
- 1937 WELTI, A., F.R.E.S., "Foxbush," Tillingdown Lane, Caterham, Surrey. *l.*
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. Sussex. *l.*
- 1927 WHITE, A. GRANVILLE, "Hilltop," Chaldon, Surrey.
- 1935 WHITEHOUSE, Prof. Sir H. BECKWITH, K.T., M.B., M.S.LOND., F.R.C.S., 62, Hagley Road, Birmingham, 16. *l.*
- 1925 WILLIAMS H. B., LL.D., F.R.E.S., "Croft Point," Bramley, Surrey. *l.*
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, London, E.4. *l.*
- 1938 WILLIS, J. R., "Vine Cottage," West Horsley, Surrey. *l. A.F.*
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
- 1926 WOOTTON, W. J., "Wannock Gardens," Polegate, Sussex. *l.*
- 1927 WORMS, The BARON DE, M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., 12, Harcourt Terrace, Salisbury, Wilts. *l, orn.*

Members will greatly oblige by informing either of the Hon. Secretaries of any errors in, additions to, or alterations required in the above addresses and descriptions.

REPORT OF THE COUNCIL FOR 1941.

The close of 1941 brings to an end the 70th year of the Society's existence, and your Council considers that, despite the difficulties arising from the war, members are to be congratulated on its active and flourishing condition.

Thirty-seven members are now known to be serving with the Armed Forces of the Crown, and your Council sincerely hopes that all will return safely to the Society, with the advent of peace, at no distant date. During the year one of them, Private (afterwards promoted to Corporal) T. G. Howarth, of the Royal Army Medical Corps, was awarded the British Empire Medal (Military Division) "for gallant conduct in carrying out hazardous work in a very brave manner" during an air raid. In another field Mr W. Mansbridge, one of the oldest members, had the honorary degree of Master of Science conferred on him by Liverpool University in recognition of his work for the advancement of learning in Liverpool and district. In our own circle, the oldest member of all, Major H. S. Fremlin, who was elected on the 4th February 1886, read a paper at the meeting on the 14th August 1941, and the occasion was marked by his being made an Honorary Member in recognition of his long and valued services to the Society.

Your Council suffered a much regretted loss during the year by the death of one of its ordinary members, Mr R. W. Attwood. The vacancy was left unfilled. The membership of the Society on the 31st December 1941 numbered 255, made up of 3 honorary, 4 life, 204 full and 44 country members. The decrease of 6, as compared with a year before, is accounted for by 5 deaths, 2 resignations, and 8 members struck off, while 9 new members have completed their obligations.

Our relations with the Chapter of Southwark Cathedral, from whom we hold our premises, and with its officials, continue to be most cordial. The improvement they have made in the heating arrangements on meeting days is much appreciated. We used the large hall for the first time for the Exhibition meeting in October, when it proved adequate for the purpose, while the furniture kindly made available to us saved us having to hire, as we had to do in our previous quarters.

Despite the loss of revenue due to the increasing number of serving members, the Treasurer's report reveals the excellent state of the Society's finances. The Council's appeal, twelve months ago, to the loyalty of subscribing members has met with a gratifying response, and arrears are now very small. The bequest of £100 from our late member, Miss Fountaine, of which we learnt during the year, was greatly appreciated.

In addition to the Annual Meeting, which closes the year, twelve ordinary meetings have been held, at which papers have been communi-

cated by Major Fremlin, Messrs Andrews, Niblett, Nixon, F. V. L. Jarvis, Syms, Eagles, Coulson, and Castle Russell. The thanks of the Society have been accorded to the authors. The lantern was in use on three occasions. The average recorded attendance at these meetings was 29. The Annual Exhibition, which had to be cancelled last year, was held in October, and proved to be an unqualified success. The recorded attendance was 116. Ten Field Meetings were scheduled, but the tragedy at the Oxshott meeting, where the leader, Mr Attwood, died, caused the last three to be cancelled. The average attendance was 9.

The "Proceedings and Transactions for 1940/41," published on the 9th September 1941, are somewhat smaller than usual, and contain, in addition to the usual records and reports, descriptions of the insects that would have been exhibited at the Annual Exhibition could it have been held, together with the papers of Mr Andrews, Dr Blair, and Mr Wakely, two plates, and an Index of Authors (prepared by Mr E. E. Syms) of all papers published in our earlier "Proceedings." In addition, there was published at the same time Part I of the "Transactions for 1941/42," containing the aforementioned paper by Mr F. V. L. Jarvis, which, by reason of its importance, was considered should be issued as early as possible.

An outstanding event in the Society's history was the bequest early in the year of the "Bright Collection," an unequalled collection of most of the known varieties of the three "blues," *Lysandra coridon*, *L. bellargus* and *Polyommatus icarus*, left to us by our lamented member, Mr P. M. Bright, of Bournemouth. The collection, in two cabinets, is for greater safety housed for the duration of the war in the Hope Department of Entomology, University Museum, Oxford, where it is available for inspection by all students. The thanks of the Society have been expressed to Professor G. D. Hale Carpenter, D.M., M.B.E., for his kindness in permitting this, and for his attentions to and care of the specimens.

The Council was much relieved when the Curator, Mr Ashby, returned after his accident and illness in the summer. He continues his hard work on the re-arrangement of the collection and reports donations of Hymenoptera from Messrs Steel, Dennis, and Odd; of Coleoptera from Messrs Denvil and Stephens; and of Micro-lepidoptera from Mr Jacobs.

Mr Syms during the year has continued his lengthy work on the preparation of the library catalogue. He reports that the number of books borrowed during the year has been smaller than usual. This was no doubt due to fewer meetings and general war conditions.

The Additions to the Library during the year are as follows:—*Donations*—"How Animals Find Their Way About," Rabaud; "Essays on Evolution," Poulton; "Insects and Man," Ealand; "Senses of Insects," Forel (all by Mr H. W. Andrews). *Purchase*—"Entomologists' Monthly Magazine." *Periodicals*—"Entomologist," "Entom. News," "Ama-

teur Entomologist," "Entom. Record." *Separates*—Capt. H. J. Hayward. *Trans., Proceedings, etc.*—Torquay N.H.S.; Annual Rep. Smithsonian Inst.; Royal Irish Acad.; Norfolk and Norwich N.H.S.; Lloydia; London Naturalist (Journal of Lon. N.H.S.); London Bird Report for 1940; I.O.W. N.H. and Arch. Socy.; Essex Nat.; Caradoc and Severn Valley Field Club; S.E. Nat. and Antiquary.

HON. TREASURER'S REPORT, 1941.

Again I am able to report a small surplus despite rising expenses and other difficulties. This fortunate position is due to the generous support the Society has received from its members and friends. For the sixth year an anonymous donor has given £20 to the Illustrations Fund. The Society is under a deep debt of gratitude to this generous friend. Our thanks are also due to Mr H. J. Turner and the Editors of "The Entomologist's Record and Journal of Variation," to those who gave donations to the Publication Fund, to certain members of the Forces who made a donation of their subscriptions, to other members who made donations to reduce the loss caused by waiving the subscriptions of serving members, and to those who defrayed the cost of the new coat and hat pegs.

I personally have to thank members for paying their subscriptions so promptly in these hard times.

BALANCE SHEET.

You will find here a new investment. The purchase of a £100 3% Defence Bond was made possible by the generous bequest of £100 by Miss E. M. Fountaine. Our investments have increased in value during the year. A special item in the Balance Sheet is £20 5s 6d, the net cost of Part I of the 1941-42 "Proceedings." This will be charged to 1942.

INCOME AND EXPENDITURE ACCOUNT.

Subscription income is £10 more than last year. This is due to the settlement of arrears. Rising Income-Tax causes a fall in our net income from interest. Ordinary expenses are heavier owing to increased cost of postage and paper. There is a non-recurring item of £9 17s 6d in connection with the Bright bequest. The two cabinets had to be sent to Oxford and we were responsible for the carriage. In addition, we decided to label the cabinets with ivory labels.

Grants to the Publication and Library Funds are both less this year. Our surplus is £2 15s.

CAPITAL ACCOUNT.

This shows the receipt of £100 4s 1d, Miss Fountaine's legacy. Entrance Fees (£1) are transferred to the Library Fund, and £7 10s was spent on a new cabinet. The Capital Account now stands at £1084 5s 11d.

PUBLICATION FUND.

The sale of "Proceedings" shows a welcome increase and offsets a

fall in the donations to this Fund. Printing and posting "Proceedings" cost £15 less than last year.

ILLUSTRATIONS FUND.

Against the donation of £20 only £1 19s is charged in the present account, but a further £14 10s has been expended. Thus the bulk of the £20 5s 6d held in suspense in the Balance Sheet will be met out of the Illustrations Fund. You will realise, therefore, what a great help this Fund is to the Society and what a comfort to the Treasurer.

Mr F. J. Coulson, on behalf of the Council, and Mr S. W. C. Williams, for the ordinary members, were good enough to audit the accounts, and we are very grateful to them.

T. R. EAGLES.

The South London Entomological and Natural History Society.

STATEMENT OF ACCOUNTS.

BALANCE SHEET at 31st December 1941.

Capital Fund—		Investments at Cost—	
General	...	£779 6 2	
Publication	...	304 19 9	
		£1084 5 11	
Special Funds—			
Library	...	£5 7 10	
Publication	...	4 2 11	
Illustrations	...	55 15 1	
		65 5 10	
Subscriptions paid in advance	...	10 0 0	
Income and Expenditure Account—			
Balance at 1st January 1941	...	£55 18 9	
Add Excess of Income over Expenditure of the year	...	2 15 0	
		58 13 9	
		£1218 5 6	
General (including Ashdown, Lachlan-Gibb, Lile, Robert Adkin, and Fountaine bequests)			
£591 15s 3d 3½ % Conversion Stock	...	£545 11 6	
£154 14s 0d 4 % Consols	...	131 14 10	
£100 0s 0d 3 % Defence Bond	...	100 0 0	
		£777 6 4	
Publication (Gift of the Misses E. F. and L. M. Chapman in memory of their brother)			
£300 0s 0d 3½ % War Stock	...	304 19 9	
		£1082 6 1	
Note—Market value at 31st December 1941, £1219.			
Net Cost of Part I of 1941-42 Proceedings carried to next year	...	20 5 6	
Cash at Bank—			
Deposit Account	...	£54 0 2	
Current Account	...	56 12 11	
		110 13 1	
Cash in hand	...	5 0 10	
		£1218 5 6	

Examined and found correct, 10th January 1942.

F. J. COULSON, *Council's Auditor.*

S. W. C. WILLIAMS, *Members' Auditor.*

NOTE.—The Society's Books, Cabinets, Type Collections, etc., are insured for £1100.

T. R. EAGLES, *Hon. Treasurer.*

INCOME AND EXPENDITURE ACCOUNT—Year to 31st December 1941.

Rent of Rooms ...	...	£50 0 0	Subscriptions (Arrears and Current) ...	...	£135 11 0
Insurance ...	...	1 6 9	Interest—		
Gratuities, Cleanings, etc. ...	...	3 11 6	£154 14s 0d 4 % Consols ...	...	£6 3 8
Secretarial Expenses ...	...	18 14 7	£591 15s 3d 3½ % Conversion Stock ...	...	20 14 2
Treasurer's Expenses ...	...	5 5 2	Deposit Interest ...	...	1 19 2
Wreath, R. W. Attwood ...	...	1 5 0			
Subscriptions—		£80 3 0			
South Eastern Union of Scientific Societies ...	...	£0 15 0	Less Income Tax ...	...	12 19 6
Commons, Open Spaces, and Footpaths Preservation Society ...	...	0 10 6			15 17 6
The Ramblers Association (Southern Federation) ...	...	0 7 6			
Carriage, Insurance, etc., Bright bequest ...	...	1 13 0			
Grant to Publication Fund ...	...	9 17 6			
Grant to Library Fund ...	...	54 0 0			
Balance, being Excess of Income over Expenditure carried to Balance Sheet	3 0 0			
		2 15 0			
		£151 8 6			£151 8 6

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CAPITAL ACCOUNT—Year to 31st December 1941.

Purchase of Cabinet	£7 10 0	Balance at 1st January 1941	...	£991 11 10
Transfer to Library Fund ...	...	1 0 0	Fountaine Bequest ...	...	100 4 1
Balance at 31st December 1941 ...	...	1084 5 11	Entrance Fees ...	...	1 0 0
		£1092 15 11			£1092 15 11

LIBRARY FUND—Year to 31st December 1941.

Magazines purchased	...	...	...	£0 15 0	Balance at 1st January 1941	...	...	...	£4 12 10
Binding	...	...	...	2 10 0	Transfer from Capital Account	...	...	...	1 0 0
Balance at 31st December 1941	...	...	...	5 7 10	Grant from Income and Expenditure Account	...	...	...	3 0 0
				£8 12 10					£8 12 10

PUBLICATION FUND—Year to 31st December 1941.

Printing and Posting 1940-41	Proceedings	...	...	£65 6 4	Balance at 1st January 1941	...	...	...	£4 11 8
Balance at 31st December 1941	...	...	...	4 2 11	Donations	...	...	...	0 10 0
					Sale of Proceedings	...	...	...	4 6 10
					Interest on 3½% War Stock (Misses E. F. and L. M. Chapman)	£10 10s, less Income Tax	£4 9s 3d	6 0 9	6 0 9
					Grant from Income and Expenditure Account	...	...	...	54 0 0
				£69 9 3					£69 9 3

ILLUSTRATIONS FUND—Year to 31st December 1941.

Blocks and Printing	...	...	...	£1 19 0	Balance at 1st January 1941	...	...	...	£37 14 1
Balance at 31st December 1941	...	...	...	55 15 1	Donation	...	...	...	20 0 0
				£57 14 1					£57 14 1

ABSTRACT OF PROCEEDINGS.

8th FEBRUARY 1941.

The President, Mr F. D. COOTE, F.R.E.S., in the Chair.

The decease, through an accident, of Mr P. M. Bright, of Bourne-mouth, was announced.

Miss W. M. A. Brooke exhibited a Calendar issued in South Africa illustrated with Natural History subjects. She regarded it as an example of the growing popular interest taken in such matters in the Dominion.

Mr S. R. Ashby exhibited a fine varied series of the Coleopteron, *Osphya bipunctata*, Fb., from Monks Wood and other places in Huntingdonshire, and called attention to the sexual dimorphism of the species as expressed in the great difference in size and in the development of the posterior femora.

Lantern slides were shown by the following members:—Miss Brooke (S. African plants, etc.); Mr Burton; Mr Dennis (British plants, etc.); and Mr W. J. Finnigan (bird life, etc.).

8th MARCH 1941.

The PRESIDENT in the Chair.

The decease of two members was reported, Mr W. H. B. Fletcher, of Bognor Regis, and Mr H. O. Holford, of Godalming.

It was announced that Mr A. H. Hamm, of Oxford, had completed 50 years of membership of the Society.

Mr S. R. Ashby exhibited the so-called "Plaster Beetles," viz., *Enicmus minutus*, L., *Lathridius nodifer*, W., and *Cryptophagus acutangulus*, Gyll.

Mr W. O. Steel exhibited a large number of species of Hymenoptera, which he was presenting to the Society's collection.

Capt. Jackson, R.N., exhibited examples of *Eurois occulta*, L., from Hants and Rannoch; *Lycia hirtaria*, Clrck., from London, Purley and Bishops Waltham.

Dr G. V. Bull exhibited a batch of undetermined ova (later found to be those of *M. neustria*) around a stem and parasites bred from larvae of *Aglais urticae*, L.

Baron de Worms exhibited a bred series of *Triphaena comes*, Hb. (*orbona*, Fb.), from a buff-coloured female taken near Forres, Northern Scotland, in August 1939. The chief feature of the series of eighty insects is the remarkable range of variation from buff specimens to red, chocolate, grey, together with a 25 per cent. proportion of the black f. *curtisii*, Newm. Dr Cockayne remarked that from the varieties bred the male parent must have been f. *curtisii* carrying a red strain with it. (2) A bred series of *Agrotis*, Och. (*Noctua*, Gn.),

ashworthii, Dbldy., raised from wild larvae taken in North Wales in April 1940, showing some variation, including a particularly dark female. (3) Some caught specimens of *Oria masculosa*, Hb., taken in the Salisbury area in August 1940, together with the first ova of this species obtained in this country. The insects were taken in the day-time when they were flushed from the local cornfields by the reaping machines. (4) A specimen of *Callimorpha dominula*, L., bred from Wiltshire in June 1940, showing remarkable aberrational features. The forewings are grey-brown with an orange suffusion and the cream spots very blurred, while the red of the hindwings is pinker than in normal insects and the black markings are replaced by grey-brown. The insect is considered to be albinistic.

Mr Nixon then read a most interesting paper on "Social Insects."

19th APRIL 1941.

The PRESIDENT in the Chair.

The decease of Mr T. H. L. Grosvenor, of Redhill, was reported. He was for many years a member of the Society and had served as President.

Mr Guy T. Adkin was elected a member.

Mr S. Wakely exhibited larvae of *Procris statices*, L.

Mr R. Attwood exhibited a series of *Erannis leucophaearia*, Schiff., from South Benfleet.

Mr Finnigan exhibited an *Abraxas grossulariata*, L., form *nigro-fasciata*, Raynor, bred from a chance larva picked up on the pavement in Earlsfield.

Mr H. G. Denvil exhibited a series of *Laria* (*Bruchus*) *pisorum*, L., with some of the peas from which they had emerged; also other peas with the beetles *in situ*.

Mr Finnigan exhibited numerous Lantern Slides.

8th MAY 1941.

Mr F. D. COOTE, President, in the Chair.

Mr S. R. Ashby exhibited the Carabid beetle, *Mormolyce phyllodes*, Hagb., from British North Borneo, a ♂ stag beetle, *Lucanus cervus*, L., from Blackheath, having very large and well-developed mandibles and a portion of an apple-tree branch containing a larva of *Zeuzera pyrina*, L.

Mr F. J. Coulson exhibited a series of each of the two species of weevils (Col.) of the pea and bean respectively, *Laria pisorum*, L., and *L. rufimana*, Boh., and stated that the latter species can be swept on open fields by the sea walls at South Benfleet, in abundance. He also showed rough sketches of the shape of the thorax of each species by which they may be easily distinguished.

Mr T. R. Eagles exhibited examples of the beetle, (*Clariger testaceus*, Preys., collected from ants' nests (*Acanthomyops flava*, Fb.) at the Box Hill Field Meeting on 26th April.

Mr F. V. L. Jarvis exhibited a number of Lepidoptera bred during the course of the experiments recorded in his paper on Hibernation which he subsequently read.

Dr K. G. Blair exhibited some pellets picked up in a small plantation of pine and birch, near Carlisle, towards the end of April. The pellets were $1\frac{1}{2}$ -2 inches in length by about $\frac{3}{4}$ in. across and were first found in numbers beneath a small pine, but subsequently over a wider area among the birches as well, and were so numerous that their disintegrated remains almost covered the ground for several yards. They were composed almost entirely of pale straw-coloured oat husks. Throughout were occasional small white pebbles or coarse sand grains as well as beetle remains, mostly *Aphodius fimetarius* and *A. prodromus*, with some weevils and other beetles of similar size. These were much more abundant in some of the pellets than in others. They were subsequently determined by Miss Hibbert-Ware as pellets cast by rooks.

Mr L. G. Payne exhibited flowers of the Wild Fritillary, *Fritillaria meleagris*, L., from a Surrey locality.

Mr W. O. Steel exhibited a number of Coleoptera taken recently from Box Hill and Leith Hill.

Mr F. V. L. Jarvis then read his paper "On the Nature and Causes of Hibernation in Lepidoptera." A considerable discussion took place. (See *Trans.*, Part I, 1941-42).

12th JUNE 1941.

The PRESIDENT in the Chair.

It was announced that the late Miss M. Fountaine, a member of the Society for many years, had bequeathed £100 to the Funds of the Society.

Mr Doudney exhibited a piece of the so-called "grafted hybrid" of broom from a laburnum tree. [See Paper by T. R. Eagles in the *Trans.*]

Mr S. R. Ashby exhibited (1) a "shield bug," *Catacanthus incarnatus*, Dru., from Ceylon. It is an orange and black coloured species which resembles a soldier's face with a glengarry cap, and is called the "Soldier's Cap." (2) The "Domino Beetle," *Anthia sex-guttata*, F. This large Carabid from India is black with six large white spots and resembles a domino.

Mr F. J. Coulson exhibited the following garden insects of all Orders and gave notes on their life history and occurrence:—LEPIDOPTERA.—*Yponomeuta cognatellus*, Hb., imago and larva. *Gracillaria syringella*, Fab., with pupa shells. *Plutella porrectella*, L., with cocoons. *Oecophora sulphurella*, Fab., with larva and pupa. "Magpie Moth,"

Abrazas grossulariata, L., with larva, empty ova, pupa, and ichneumon cocoon, also yellow *Ophion* Ichneumon, *Ophion luteus*, L. "Garden Pebble Moth," *Pionea forficalis*, L., with larva, cocoons, pupa, and final larval skin. "Small Magpie Moth," *Eurrhyncha urticata*, L., with larva, cocoons and pupa. "Garden China-mark Moth," *Ebulea sambucalis*, Schiff., with larva, pupa and cocoons. "Vapourer Moth," *Orgyia antiqua*, L., with larva, cocoon, empty pupae (♂ and ♀) and ichneumon cocoons. "Common Plume Moth," *Pterophorus monodactylus*, L., with larva and empty pupa cases. "Garden Carpet Moth," *Xanthorrhoe fluctuata*, L., with larva and pupa. Cabbage Moth, *Mamestra (Barathra) brassicae*, L., with larva and pupa (empty). The Dot Moth, *Mamestra persicariae*, L., with larvae and empty pupa. Golden Plusia Moth, *Plusia moneta*, Fb., with cocoons. COLEOPTERA.—"Devil's Coach Horse," *Ocypus olens*, Müll., with larva. *Coccinella bipunctata*, L., larva and pupa shells. *Longitarsus succineus*, Foudr., common on *Chrysanthemum*. "Wireworms"—beetles, *Agriotes obscurus*, L., *A. lineatus*, L., and *A. sputator*, L. *Clytus arietis*, L., often on apple trees. *Feronea madida*, F., a gardener's friend. *Tenebrio molitor*, L., *Tenebrio obscurus*, Fb., *Pyrochroa serraticornis*, Scop., with dried larval and pupal skins. HEMIPTERA.—*Pilophorus perplexus*, D. & S., which occurs with the ant mentioned later, at honeydew on leaves of apple. Also *Dicyphus pallicornis*, Fieb., bug occurring on the underside of Foxglove leaves in gardens, and *Orthotylus virescens*, D. & S., abundant on cultivated broom. HOMOPTERA.—(1) *Philoenus spumarius*, L., the Cuckoo-spit insect. (2) *Eupteryx abrotani*, Dougl., on "old man" (*Artemisia*) in gardens. (3) *Typhlocyba rosae*, L., generally on roses in gardens. HYMENOPTERA:—(1) *Apis mellifera*, L. (2) *Bombus lucorum*, Smith. (3) *Bombus venustus*, Smith. (4) Small Black Ant, *Acanthomyops nigra*, L. (5) *Ophion luteus*, L.

Mr W. J. Finnigan exhibited two larvae of one of the Argynnids, probably those of *Argynnis cydippe*, L. (*adippe*, L.).

Mr E. E. Syms exhibited examples of the four species of British Earwigs, viz., *Forficula auricularia*, L., *F. lesnei*, Fin., *Labia minor*, L., and *Apterygida albipennis*, Megerle.

Mr J. A. Stephens exhibited Coleoptera taken at Chatham, 1941. (1) *Epipolaeus caliginosus*, Fb., was taken 30th January from straw siftings which had previously been searched without a sign of the insect. London District local. (2) *Liparus coronatus*, Gz., taken under stones, 15.v.41. Local in the London area. (3) *Amara eurynota*, Pz. (*acuminata*, Payk.), taken under stones, 5.v.41. Not common in the London area. (4) *Panagaeus bipustulatus*, Fb., taken under stones, 27.v.41.

Mr T. R. Eagles exhibited examples of *Allium triquetrum*, L., and an unnamed species of a Himalayan onion plant (*Allium*).

Mr F. D. Coote exhibited pellets of a bird thought to be those of the Barn Owl, *Tyto alba*, Scop., which is frequently heard around Cheam.

Mr W. O. Steel recorded the following species of Coleoptera in his garden: *Trichonyx sulcicollis*, Reich., *Planeustomus palpalis*, Er., and *Scopaeus sulcicollis*, Steph.

Mr Syms gave some interesting notes on the British species of Earwig which he had shown.

Mr Eagles read his Paper on the "Onion Fly, *Hylemyia antiqua*, Mg.," in view of its possible economic importance as a pest of the onion crops. [See *Trans.*]

10th JULY 1941.

The PRESIDENT in the Chair.

Mr T. R. Eagles exhibited a living example of the large Continental Coleopteron, *Morimus funereus*, Muls., a Longicorn found in a nursery at Enfield in June. For comparison he exhibited specimens of *Morimus asper*, Sulz., and of *Dorcatypus tristis*, Fab., lent by Dr Blair. The *Morimus* was subsequently presented to the National Collection at South Kensington; it remained alive until mid-December, feeding on the bark of twigs of various trees, oak, ash, willow, hawthorn, but would not touch lime.

Mr H. J. Turner exhibited three species of the Indo-Malayan Pierid genus *Delias*, Hb., of which genus many species are characterized by extremely plain upperside of wings but brilliantly coloured undersides. The species shown were:—(1) *D. eumolpe*, Gr.-Sm., from Kina Balu in Borneo at an elevation of about 4000 feet and found nowhere else. (2) *D. zebuda*, Hew., from Amboina in the Moluccas and in the Celebes, readily distinguished from other species by the more pointed shape of forewing. The pattern on the underside much resembles that of the first species. (3) *D. isse*, Cr., from the Moluccas is not so brilliant on the underside as the other two. The uppersides of all three are mainly white, the two first having black apex and blackish apex respectively, the former with a thin black line margining the hindwing, the second having no other marking and the apex only greyish white. *D. isse* has slight apical marking on the forewings and the hindwing has a margin of greyish black through which the deep yellow round spots of the upperside show.

Mr L. G. Payne exhibited the following plants:—*Astrantia major*, L.—A very rare Umbelliferous plant occurring in beech woods in Shropshire in one large patch with scattered outliers. *Leonurus cardiaca*, L.—A tall Labiate plant found occasionally in hedgerows and on waste ground. The specimen came originally from Yorkshire. *Carex pendula*, Huds.—One of the tallest native sedges occurring normally in damp woods on acid soil. *Pyrola minor*, L.—A creeping native nearly evergreen plant with pinkish ericaceous flowers. It occurs very locally in South England but is more common in the North. The specimen is from West Surrey.

Mr F. D. Coote exhibited larvae and ova of *Callophrys rubi*, L., from females taken at Horsley; ova of *Brenthis selene*, Schiff., laid in a pill-box; and reported observing *Brenthis euphrosyne*, L., depositing ova on other plants than violet.

Mr Coulson then gave his Paper on the "Coleoptera of Bookham," and exhibited four storeboxes containing examples of a large number of the species mentioned. [See *Trans.*]

14th AUGUST 1941.

The PRESIDENT in the Chair.

The decease of Mr R. W. Attwood was reported.

Mr Horace Rupert Last, 12 Winkworth Road, Banstead, Surrey, was declared a member.

Mr H. G. Denvil exhibited the beetle, *Crioceris lilii*, Scop., taken by Mr L. F. Barton on Solomon's Seal, *Polygonatum officinalis*, All., in a garden at Chobham in Surrey.

Mr Hy. J. Turner exhibited the following species of the Danaid Family of Butterflies from Sumatra, recently taken from his setting-boards. It may be called to mind that this family is more or less immune from the attacks of birds and reptiles owing to the acid juices of their bodies. The Indo-Malay species of *Danais*, the typical genus, Moore divided into sections of which several were comprised in the exhibit. Of the *Salatura* section, to which the so-called *plexippus* of America belongs, there was *D. melanippus*, Cr., ssp. *hegesippus*, Cr., widely distributed in the Malay Peninsula. In the *Ravadeba* section *D. aspasia*, Fb., ssp. (?) *crocea*, Btlr., is an attractive representative. Group *Parantica* is represented by *D. eryx*, Fb., f. *agleoides*, Fldr., a common lowland butterfly. Group *Chittira* is represented by *D. banksi*, M., common in the plains and foothills. *D. similis*, L., one of the commonest butterflies of the East Indies, represents the group *Rodena* in the form *vulgaris*, Btlr., and its sub-form *macrina*, Fruh., which is darker due to somewhat widened and extended black suffusion. The genus *Ideopsis*, Horsf., is represented by the beautiful black and white (semi-transparent) *I. daos*, Bdv., the Sumatran form being *perakana*, Fruh. The genus *Hestia*, Hb., is represented by the extremely large *H. hypermnestra*, Wwood., in the form *hera*, Fruh. (*luteata*, Btlr.), a semi-transparent white with large round spots scattered over the wings. Expanse 150 mm. There was only one species of the extensive genus *Euploea*, Fb., *E. diocletianus*, Fb., ♀ (= *rhodamanthus*, Fb., ♀), an attractive butterfly. Included with the above was a Pierid with a very strikingly brilliant underside, not a *Delias* but a *Prioneris*, *P. hypsipyle*, Weym. Upperside white with irregular black marginal marking, underside forewing deep black with white inner margin, brilliant yellow hindwing with wide black margin, widely expanded at the base with a deep red blotch discally. Locally abundant above 4000 feet, only found in Sumatra.

Mr J. A. Stephens exhibited the following Coleoptera from the Chatham District. (1) *Dirrhagus pygmaeus*, Fb., taken in Cobham Park, 27th June, by sweeping, in the evening, a pathway through ferns, bracken, etc. It is said by Fowler to be very rare and found on ferns in the New Forest. Only one specimen was taken, though much sweeping was done afterwards on the ferns for several days. Stephens records it with doubt from Norfolk. (2) *Aulonium trisulcum*, Geoff., taken in Cobham Park, 18th July; 2 examples under bark of an elm tree which has been down for a long time (at least 2 years). The following week another was taken from the same tree, also pupae. Rare. Recorded from Enfield, Edmonton, Winchmore Hill, and Poole, in burrows of *Scolytus scolytus*, L. (3) *Tritoma bipustulata*, Fb., taken in Cobham Park, 24th July, on old dead ash tree near a very small piece of fungus which was dry. As a rule rare in the London District. (4) *Sphindus dubius*, Gyll., taken in Cobham Park, 4th August. One example, and on 8th August several more from a rotten hornbeam tree in company with several other species of beetles; rare. (5) *Hydrous piceus*, L., taken at Gravesend in a ditch adjoining the canal. Two specimens taken in the same sweep, 25th July. Found in the London District.

Mr T. R. Eagles exhibited the "Rose Plantain," a case of "phylody" of the seed head of *Plantago media*, L., a botanical curiosity that is described by Gerarde and Clusius.

Mr F. H. Tompkins exhibited a specimen of *Limenitis camilla*, L., ab. *nigrina*, Weym., and a normal form for comparison.

Major Fremlin exhibited examples of White Ants and the moth, *Cactoblastis cactorum*, Berg., and then read his paper, "A Visit to S. Africa." [Owing to it being impossible to complete the identification of the birds and other species mentioned and the necessity of saving paper, this account has not been printed.]

In proposing a vote of thanks from the chair, the President informed Major Fremlin that he was now the oldest member, having joined in 1886, and asked his permission to allow the Society to make him an honorary member in recognition of his services.

11th SEPTEMBER 1941.

Mr F. D. COOTE, President, in the Chair.

Mr H. W. Andrews exhibited a number of species of Diptera in illustration of his paper.

Mr L. Parmenter showed a series of the Asilid (Dip.) *Machimus atricapillus*, Fln., each specimen being shown with its prey, which included *Beris vallata*, Forst., *Chorisops tibialis*, Mg., *Melanostoma scalare*, Fb., *Musca corvina*, Fb., *Pollenia rudis*, Fb., *Syrphus balteatus*, D.G.

Mr Eagles spoke of the abundance of fungus in the woods in August and September 1941 after the heavy rains and showed specimens of

Armillaria mellea, Vahl, *Craterellus cornucopioides*, Fr., *Peziza aurantia*, Oed., and *Nyctalis asterophora*, Fb., the last-named growing on the fungus *Russula nigricans*.

Mr Eagles then exhibited specimens of *Acrocera globulus*, Panzer (Diptera, *Cyrtidae*), taken on 16th August 1941 by his son, J. R. Eagles, whilst beating young birch trees near the "Wake Arms," Epping Forest. He referred to the paper by Mr H. W. Andrews read before the Society on 14th April 1938 (page 76, *Proceedings and Transactions*, 1938-39), in which these flies are dealt with and the manner in which they parasitize spiders is described.

Dr K. G. Blair exhibited some living examples of *Lilioceris lili*, Scop., from Chobham, Surrey. They were collected on 21st August by Mr L. F. Barton and were found in considerable numbers on the leaves of *Lilium candidum* and of Solomon's Seal (*Polygonatum*) and in confinement had taken readily to Lily of the Valley (*Convallaria*) and Bittersweet (*Solanum dulcamara*), but less readily to *S. nigrum* and had not touched potato, though this has been recorded as a foodplant. They were present last year in the same area but in much smaller numbers; the origin of the outbreak was unknown.

Mr Sparrow exhibited larvae of *Sphinx ligustri*, L., *Macrothylacia rubi*, L., and *Gonodontis bidentata*, Cr.

Mr S. R. Ashby exhibited an example of *Plusia moneta*, Fb., taken in a garden at Harrow, 4.vii.41.

On behalf of Mr Hy. J. Turner, the President exhibited several species of the extensive Pyraloid genus *Glyphodes*, Gn., of which our *G. unionalis*, Hb., is the only British representative. Hampson in 1898-9 listed 142 species in the genus, spread all over the world. The species exhibited were:—*G. laticostalis*, Gn., India, which has a wide uniform dark brown costal streak, the ground being shining white. (In fact, the white part of the wings in almost every species is glossy white.) *G. pfeifferi*, Led., India, is white with a dark costa and fine dark outer margins which contain a regular row of fine silver spots. *G. pryori*, Btlr., Japan. *G. glauculalis*, Gn., Fiji, is a large all-green species with a dark costal streak. *G. lucidalis*, Hb., E. Peru, has a type of marking, glossy white with black edging around all the wings, of which examples occur the world over. *G. carthusalis*, Walkr., Sikkim. *G. sinuata*, Fb., Cameroons, a beautiful species somewhat larger than the average size of a *Glyphodes*, has a glossy pale ochre tinted wing with margins of a purple colour and irregular in width. *G. hilaralis*, Wlkr., India, is pale green with golden yellow costa and margins to the wings. *G. decapitalis*, Dogn., from Peru.

Capt. R. A. Jackson, R.N., gave an account of his collecting recently in S. Hampshire.

Mr H. W. Andrews then gave his paper on "The Wing-markings in Diptera." (See *Trans.*)

Mr Parmenter, in his remarks on the Paper, said:—"Mr Andrews' paper has been most interesting and there are many points worth future

consideration. At the moment I should like to make a suggestion as to the use made of wing markings in at least one case of a sexually dimorphic species. Most of you must have seen flies of the family *Dolichopodidae*, the green, long-bodied, long-legged flies so often seen on mud and large green leaves. In several genera, notably *Dolichopus* itself, the males of some species have ornamented tarsi which are swollen, coloured and sometimes plumed. Males so decorated will alight close behind a female and wave their conspicuous pair of limbs in a kind of courtship display. In certain species, however, the legs are all of normal shape and hue but the males have wing markings. In *Poecilobothrus nobilitatus*, L., for example, the wings of the male are smoky brown with a silvery tip. The male waves his wings and not his legs in his display before attempting coupling. The wing tips tend to flex more than the rest of the wing as they are raised, thereby catching the light and thus making a distinct flash in sunlight. Mr Andrews has drawn our attention to a subject which should amply repay further study and we are indebted to him for a paper well worthy of publication in the Society's transactions."

8th NOVEMBER 1941.

The PRESIDENT in the Chair.

Mr S. R. Ashby exhibited an unusually large ♂ specimen of the Goliath beetle, *Goliathus druryi*, Westw., from Sierra Leone.

Mr Hy. J. Turner exhibited examples of 2 species of *Erycinidae* and a *Lycaenid* from S. America. The former were (1) *Zeonia licursis*, Fb., from S. Brazil, a species of a genus with hyaline wings and having considerable resemblance to some of the larger Hymenoptera, and also from S. Brazil. (2) *Baeotia bacaenis*, Hew. An extensively black species with the median area of both wings forming a white conjoint oval, and with yellow basal and marginal stripes. One of the specimens shown was the form *elegantula*, Hpffr., with stronger yellow marking, from Peru. The *Lycaenid* was *Thecla marsyas*, L., a large sky-blue species, from S. Brazil, with two tails of unequal length on the hindwings and with almost falciform apex to the forewings. Very common from Panama to the Argentine. The *Erycinidae* are a group mainly of the Western Hemisphere, only a few species are found in the Eastern Hemisphere, one of which is our *Hamaeaeis lucina*, Linn. The *Lycaenidae* are a group mainly confined to the Eastern Hemisphere, although a large number of aberrant *Lycaenids*, mostly *Theclids*, are found in the Western Hemisphere chiefly in S. America.

Dr Blair exhibited three Australian beetles from Sussex: (1) *Saproscites mendax*, Blackburn, originally taken by Mr C. E. Tottenham in Arundel Park, in 1921, where they were living in rotten beech logs in association with *Dorcus parallelipedus*, L., and recorded as *S. parallelus*, Har. (?), (see *Ent. Mo. Mag.*, 57: 252; 66, 1930; 231). This colony maintained itself for many years and is probably still in

existence. (2) *Syagrius intrudens*, Waterhouse, found near Horsham by Mr H. Dinnage in 1932. (*Ent. Mo. Mag.*, 68: 187.) The beetles were in some numbers among Australian ferns, *Onoclea sensibilis* [?] long established there. The species was described in 1903 on specimens found in the Royal Botanic Gardens, Dublin, doing much damage to ferns, and I am informed that the colony is still flourishing and has spread to the open. Oddly enough it is not known in its home country, though as the genus is entirely Australian there can be little doubt about its origin. (3) *Paratillus carus*, Newman, a single specimen also sent by Mr Dinnage. This was taken by a Mr Cribb at Ditchling in June 1936, but unfortunately the captor is unable to recall the circumstances (*Ent. Mo. Mag.*, 1942: 13). It is probably a predator in the galleries of some wood-boring beetle, and hence is probably also established. One naturally wonders whether these three occurrences are due to some common origin, but nothing appears to be known to account for them.

Mr Coulson exhibited a large number of larval and pupal skins of Coleoptera, which later on he intended to place in the Society's collection.

Members generally gave much information on the present season.

Later, Mr W. J. Finnigan showed a considerable number of lantern slides depicting well-known localities and interesting items in Natural History.

13th DECEMBER 1941.

The PRESIDENT in the Chair.

Dr B. N. Blood, L.R.C.S.I., 25 Spencer Gardens, Eltham, S.E.9; Rev. Canon T. G. Edwards, Holy Trinity Vicarage, Tulse Hill, S.W.; Lt. F. W. Smith, R.N.V.R., High Mains, Closeburn, Dumfriesshire; R. L. E. Ford, "Durfold," 34 Park Hill Road, Bexley, Kent; and H. G. W. Taylor, 11 Granville Road, Sidcup, Kent, were declared elected members of the Society.

Capt. R. A. Jackson, R.N., exhibited *Euphyia* (*Camptogramma*) *bilineata*, L., *Anaitis efformata*, Gn., and *Oporinia* (*Oporabia*) *dilutata*, Brk., all from the Forest of Dean.

Mr S. R. Ashby showed two examples of the Harlequin Beetle, *Acrocinus longimanus*, L., a very large and conspicuous beetle from Brazil.

Mr J. A. Stephens exhibited further species of Coleoptera from the Chatham district.

Mr Coulson exhibited a long series of *Abraaxas grossulariata*, L., bred from wild larvae, showing more or less aberration; and a large number of British Hemiptera.

Mr T. R. Eagles exhibited a long series of the f. *rutilus*, Wernb., of *Chrysophanus dispar*, Haw., and, for comparison, a specimen of *C. virgaureae*, Linn.

Mr Hy. J. Turner exhibited ♂, ♀ and undersides of the tropical African *Charaxes guderiana*, Dew., as an example of extreme sexual dimorphism. In size, marking, colour and general shape there was practically no similarity. The genus *Charaxes* consists of numerous species of strong muscular bodied butterflies confined to the tropical or sub-tropical regions of Africa and Asia. One species only, *C. jasius*, L., is distributed in the coastal areas of the Mediterranean Palaearctic Regions. The imagines do not visit flowers, but are attracted by exudations from tree trunks, moisture patches and artificial bait.

Mr J. S. Taylor had recently sent another *Charaxes* from Graaff Reinet, *C. jahlnusa*, Trim. It is said to be not common. Also included was a Pierid sent at the same time, *Belenois (Pieris) mesentina*, Cr., a very widely distributed and common species, S. Africa to the Nicobars in the Indian Ocean, from Persia, Palestine, Bagdad, Sikhim, India, etc.

Mr Niblett's paper, "The Cynipid Genus *Isocolus*," was then read by the Minuting Secretary, in the absence of the author. (See *Trans.*)

10th JANUARY 1942.

Mr F. D. COOTE, President, in the Chair.

Dr B. C. A. Leeper was declared elected a member.

Dr E. A. Cockayne exhibited five *Oporinia christyi*, ab. *latifasciata*, Prout, three males and two females, bred Wendover, 1923, and a sixth from Cranborne, Dorset. The fact that four of these six banded specimens are males shows that this form is not a sex-linked recessive as it is in *O. dilutata*, Schiff., and in *O. autumnata*, Bork. The two little processes on the eighth abdominal somite of the male are much closer together in *christyi* than in *dilutata*, and the spine on the valve distinguishes *christyi* from *autumnata*. These males show the spine and have the processes close together.

Mr Hy. J. Turner exhibited a series of the Noctua, *Phytometra (Plusia) aurifera*, Hb. (*orichalcia*, Fb.), from Teneriffe. It is very occasionally taken along the S. Coast of England. The species has a very wide range, including the Azores, the Atlantic Islands, the West Coast of Africa, all around the Mediterranean coasts, N. India, the Malay Islands, and a closely allied form has been named from Australia. He has a specimen labelled Hanover, and our fellow-member, Mr J. Sneyd Taylor, some years ago sent one from Barberton in the E. Transvaal of S. Africa. It seems to vary but little.

Mr A. W. Buckstone exhibited the following British Rhopalocera:—*Pyrameis cardui*, L.—Markings on all four wings reduced in size. Bred, Oxshott ova, 1922. *Maniola (Epinephele) jurtina*, L.—The following seven female specimens—(1) Orange patch on forewings scarcely discernible. Ashted, 28th June 1933. (2) Orange patch occupying entire discal area of forewings and about half of that area of the hindwings. Box Hill, 22nd July 1936. (3) Spots much reduced in size;

those of left forewing being smaller than those of the right. Underside of wings normal. E. Kent, July 1931. (4) Orange patch of left forewing pale yellow, that of right dirty white. Epsom, 21st September 1932. (5) Spots very large and blind and underside normal. Ashtead, 28th June 1933. (6) Underside of all wings being greenish-grey. Bentley, Hants, July 1930. (7) Sub-apical spots in triplicate on underside. Clandon, August 1906; and a male bleached on all four wings. Ashtead. 28th June 1933. *Heodes* (*Chrysophanus*) *phlaeas*, L.—A female approaching somewhat to ab. *schmidtii*, Gerh., and having the spots reduced in size. Wimbledon, 22nd May 1926. A small series of ab. *eleus*, Fab., all of the summer brood, from Surrey and Kent. *Polygonia c-album*, L.—Extreme pale and dark forms from Surrey. A male with the comma mark of left hindwing elongated, that of the right wing being normal. Bookham, Surrey, bred June 1939. *Colias croceus*, Frery.—(1) The following specimens bred from ab. *helice*, Hb., ova. Fetcham, Surrey, November 1941. (1) Four pale males. (2) A female having ground colour of forewings almost white and hindwings blackish with only slight indication of yellow spotting in marginal bands of all four wings. (3) Two somewhat similar specimens but ground colour inclining more to yellow. (4) One with lower half of marginal border of hindwings wanting. (5) A female specimen having forewings of typical ground colour, hindwings blackish. (6) ♀ only slightly marked with yellow in margins of all wings. Several of these specimens of *croceus* have a slight suffusion of black spreading from the margin of forewings. He also showed the following aberrations of this species:—♂, central spot on underside of right hindwing dwarfed. Shoreham, Sussex, August 1936. ♂, sub-marginal line of spots on underside of hindwings represented by one spot only, this spot being situated near the anal angle. Dorking, 26th August 1932. ♂, underside of forewings with a short black horizontal line situated between the central spot and the outer margin. Sandown, I. of W., 10th September 1938.

Mr T. R. Eagles exhibited a flowering spray of the English *Daphne laureola*, L., and a much branched and curly twig of the form of the hazel known as "curly nut" which came from a West country hedge-row.

Baron de Worms, on behalf of a non-member, exhibited a gynandromorph of *Cleora lichenaria*, Hufn., which he believed was unique, also a specimen of *Hecatera dysodea*, Hb., from Somerset, 1935.

Subsequently Dr E. A. Cockayne contributed the following note: "*Cleora lichenaria*, Hufn. Gynandromorph. R. antenna and frenulum ♂; L. antenna and frenulum ♀; genitalia ♀."

There are two records of gynandromorphs of this species in Schultz lists. (1) R. ♂, L. ♀. Zeller, "Stett. Ent. Zeitg." (1843), iv, 231. (2) Undescribed. "Entomologist" (1898), xxxi, 303. Robinson, New Forest.

Capt. Jackson, R.N., re-exhibited the *Oporinia* species, the identity

of which was still in doubt; he also reported that he had observed a large butterfly from a ship in convoy 800 miles west of Queenstown.

Mr Sparrow exhibited hibernating larvae of *Procris statices*, L., *Leucoma salicis*, L., *Agrotis exclamationis*, L., *Eurrhynx urticae*, Schiff., etc.

A paper was read by the Secretary on behalf of Mr S. G. Castle-Russell, "The Occasional Scarcity and Abundance of Lepidoptera, with Special Reference to the Rhopalocera." A considerable discussion took place. Canon Edwards, Dr Cockayne, Capt. Jackson, Messrs E. E. Syms, H. Wakely, W. H. Harris, H. W. Andrews and others taking part. (See *Trans.*)

24th JANUARY 1942.

ANNUAL MEETING.

Mr F. D. COOTE, F.R.E.S., President, in the Chair.

The Reports of the Council and Treasurer with the Balance Sheet were read and carried.

The following is a List of those members declared elected for Officers and Council during the ensuing twelve months:—*President*—S. Wakely. *Vice-Presidents*—F. D. Coote, F.R.E.S., and H. G. Denvil. *Treasurer*—T. R. Eagles. *Secretaries*—F. Stanley-Smith, F.R.E.S. (*Corresponding*), and H. G. Denvil (*Minuting*). *Editor of Proceedings*—Hy. J. Turner, F.R.E.S., F.R.H.S. *Curator*—S. R. Ashby, F.R.E.S. *Librarian*—E. E. Syms, F.R.E.S. *Council*—J. H. Adkin; K. G. Blair, D.Sc., F.R.E.S.; E. A. Cockayne, D.M., F.R.C.P., F.R.E.S.; F. J. Coulson; S. P. Doudney; W. J. Finnigan; C. N. Hawkins, F.R.E.S.; Capt. R. A. Jackson, R.N., F.R.E.S.; L. G. Payne; Mrs F. Stanley-Smith.

The President then read his Address, most of which dealt with history, status and progress of the Society.

Mr S. Wakely was then inducted to the chair as the new President. After thanking the Society for the honour they had conferred upon him he proposed a vote of thanks to Mr Coote for his address and asked permission for it to be printed in the forthcoming *Proceedings*. Mr Coote replied and assented to the proposal.

Votes of thanks were then proposed to the Treasurer, the Officers, the Council, the Auditors and the other officials. Suitable replies were made by or on behalf of the recipients.

ORDINARY MEETING.

Mr S. WAKELY, President, in the Chair.

Mr Leslie Dermott was declared elected a member.

The President exhibited a varied series of the Micro-Lepidopteron, *Prays curtisellus*, Don., including the form *rustica*, Haw. He also reported a letter received from Mr F. N. Pierce, who has been investigating the relationships of the *Caradrina* species, saying that what are

called *alsines*, Brahm, are generally *blanda*, Tr., and that what has been called *exigua*, Hb., falls into two species; but he is not yet certain whether both these forms occur in this country.

Mr S. R. Ashby exhibited the lace-wing, *Chrysopa carnea*, Steph., which he found hibernating in his house.

Mr T. R. Eagles exhibited a specimen of the Coleopteron, *Ptinus tectus*, Boield., a pest of food stuffs.

Mr Sparrow exhibited two further Lepidopterous larvae which go through the winter in that stage, one a Coleophorid (case-bearer), the other an Oecophorid, *Dasycera oliviella*, Fb., which is found in decayed wood.

Mr E. E. Syms reported a robin's nest in Hertfordshire with 3 eggs on 16th December 1941, which seven days later had two young birds and one egg.

Mr Mellows reported that *Limenitis camilla*, L. (*sibilla*, L.), had been very plentiful in woodlands in the Soke of Peterborough in 1941; the form *nigrina*, Weym., had been seen; also that *Polygonia c-album*, L., had been plentiful in the same area.

Rev. Canon Edwards reported a moth from the framed table of marriage fees in his vestry (Tulse Hill) two years ago. It was identified as *Mompha nodicolella*, Fuchs. He doubted whether the species had been recorded from the London area previously. The larva is found in swellings (galls) in the stems of *Epilobium angustifolium*, L.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen,—You will realise from the Council's report you have just heard read that in spite of very difficult circumstances the Society is in a healthy state, far more than might have been reasonably expected twelve months ago.

Although the Council provided in the programme for the possibility of holding the Annual Exhibition, they certainly did not anticipate it would materialise in so successful a form.

Thanks to the energy displayed by our able Assistant Secretary for Indoor Meetings, we have had read several papers of high merit, and the Council were so impressed with the value of Mr Jarvis's communication on "Hibernation" that they decided not to delay its publication, but issue it with the 1940-1 "Proceedings" as part of the 1941-2 "Proceedings."

Another very agreeable item in the report is that the decrease in membership is only 6 instead of a larger figure anticipated.

We were all very sorry to hear a few weeks ago that Miss Chapman contemplated resigning. She and her late sister joined the Society in 1924 and at that time gave the Society a donation of £300 in memory of her brother, one of our most learned and prominent members, who had died a few years previously [Since writing the above Miss Chapman has been made an Hon. Member.]

We must all agree that the Hon. Treasurer is to be congratulated in presenting such a satisfactory balance sheet in these difficult times.

I hope that members in touch with those serving with H.M. Forces will assure them that we constantly think of them and look forward to their safe return.

We learn with great sorrow that five of our members have passed away.

Mr H. O. Holford, who died on the 3rd March last, became a member in 1937. His home was at Elstead, near Godalming, Surrey, and many of us first made his acquaintance at those enjoyable Field Meetings at Cutmill, near his home, where he entertained us to tea on each occasion.

Mr W. H. B. Fletcher, M.A., who died last March, joined the Society so long ago as 1887 and was a Life Member. At the time of his decease, at the age of 88, he was the senior member of the Royal Entomological Society. He was specially interested in the Zygaenids and other "Micro" groups.

Mr Percy Bright lost his life in a motor accident on the 7th February 1941. He was a member of this Society from 1890 to 1900 and rejoined in 1909. He was 78 when he died, and had long been a very prominent citizen of Bournemouth, occupying the Mayoral office for three years. In spite of his very busy life he managed to give very considerable attention to his one relaxation—Entomology. Some time ago he disposed of his large collection of Heterocera, which is now in the Tring Museum. His monograph, compiled in collaboration with Mr H. A. Leeds, on *Lysandra coridon* has made his name famous among entomologists. The South London Entomological and Natural History Society now possesses a monument to his memory in the type collection of *Lysandra coridon*, Poda, *L. bellargus*, Rott., and *Polyommatus icarus*, Rott., which he bequeathed to this Society.

News has only recently been received that Mr Frank Goode died early in the year. He lived at Ilford, but I have no knowledge so far of his entomological activities. He joined the Society in 1936.

One of the saddest blows the Society has sustained was the death at the Field Meeting at Oxshott on the 20th July last of Mr R. W. Attwood. [A special obituary notice is being included in our "Proceedings."]

Two other entomologists, formerly members of this Society, died last year:—

The Rev. R. E. Frampton, M.A., who joined the Society in 1921 and continued his membership for 15 years.

Mr T. H. L. Grosvenor, a member from 1904 to 1936. He served on the Council for several periods and was President in 1925 and 1926 and again in 1932. He was specially interested in the Family Zygaenidae and contributed several papers on that group to the Society.

I should like also to refer to other workers in Entomology who have

passed away. They were not members of this Society, but well known to many of our members:—

The Rt. Rev. W. G. Whittingham, who died recently at the age of 80. He was Bishop of St Edmundsbury and Ipswich from 1922 to 1940. He was always a very active personality and in spite of the heavy duties of his clerical life managed to find time for Ornithology, in which he was an expert, and the study of Micro-lepidoptera. Many will remember the very helpful lecture he gave this Society on the latter subject a few years ago.

Dr H. Eltringham, F.R.S., was a Fellow of the Royal Entomological Society, and filled most of the honorary offices of that Society at various times. He published important papers on the Acraeinae Butterflies of S. Africa and many others on the general structure of Lepidoptera. He was an adept in Photo-microscopic work and his death is a great loss to Entomological Science.

I will now ask you to stand for a few moments in memory of our colleagues who have passed away, and might I suggest that we should also pass our thoughts to those of our members who are serving in the Forces, especially those who at this time are facing great perils for the sake of civilisation.

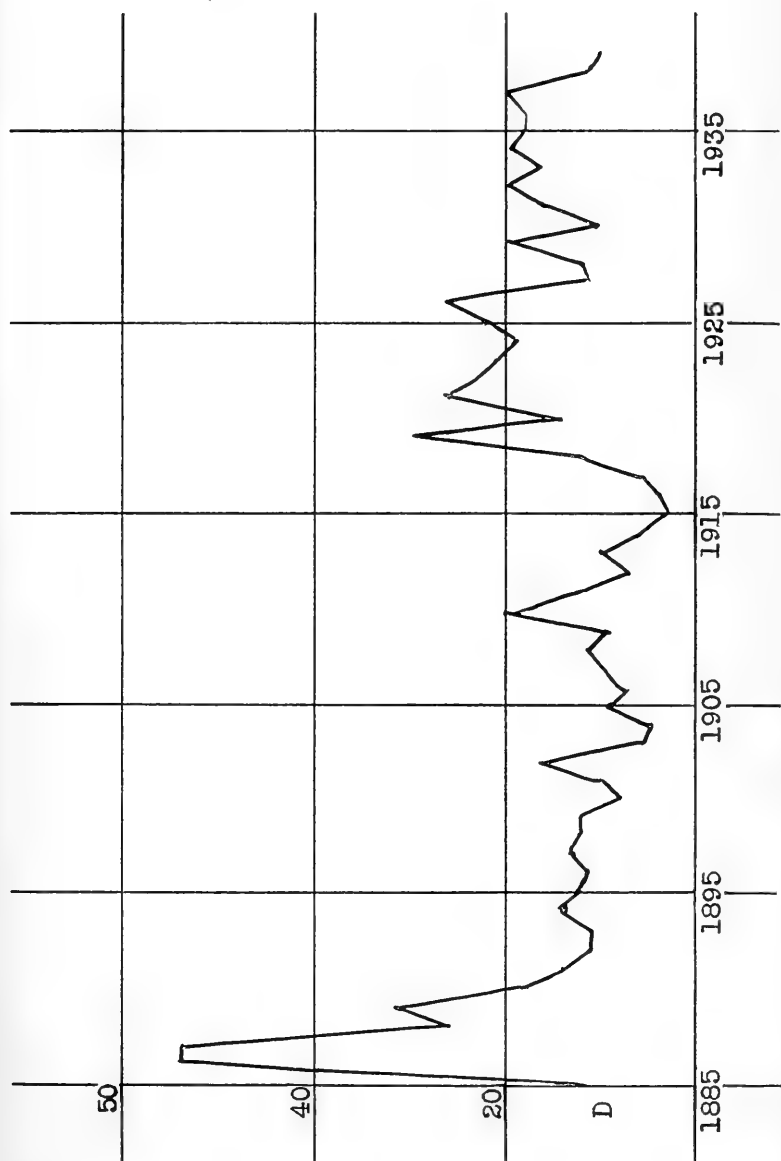
As to the future, we cannot foretell. It looks a little less black than twelve months ago, but we must be prepared beforehand for possible and probable difficulties.

It might be interesting to recall the effect of the Great War, 1914-1918, had on the progress of the Society, and the graphs (plts. VI, VII) I have prepared may help in this respect. It looks rather like a medical chart of your President during last year, his temperature rising rapidly during the early months of his occupancy of the Chair as he realises his awful responsibilities, then a brief period of comparative calm as during the summer the joys of field work serve to detract his mind, only to rise again most alarmingly as he approaches the time when he must render an account of his services and read an address, finally passing away in a coma.

However, the graphs are intended to show (A) the rise and fall of total membership at the end of each year from 1872, when the Society was founded, also the numbers for five (B) and ten (C) years' membership respectively. The other graph (D) shows the number of new members elected each year since 1885.

I have marked the period of the Great War, 1914-1918, and it will be noticed that the Society from that point of view was in one of its periods of decline, i.e., though the totals of members of five or ten years' service and over do not show any marked decline, nevertheless the sign of falling total membership was present. Naturally, during the War this decline was not arrested and the total membership fell considerably.

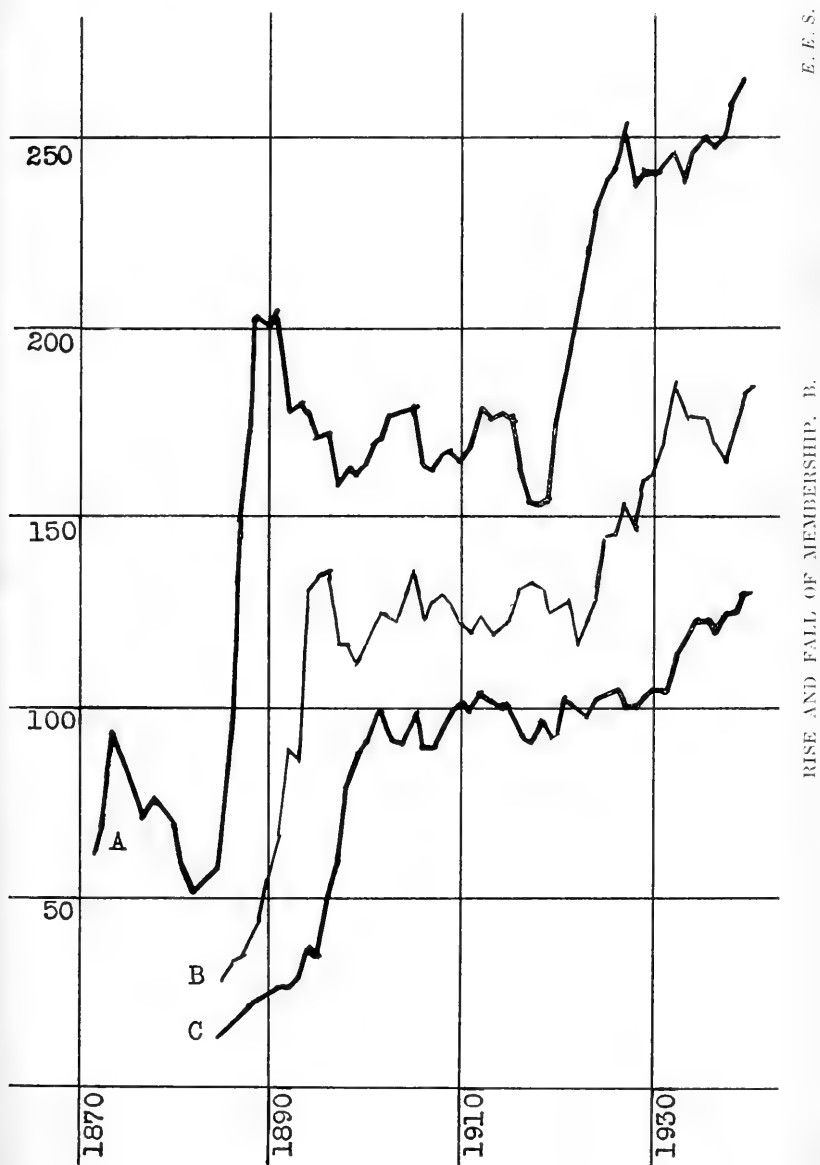
The figures for the few years before the outbreak of the present War show a steady increase and we might safely assume, but for the war, this increase would have been maintained for some years at least.



RISE AND FALL OF MEMBERSHIP, A.

E. E. S.







Present conditions differ very much to-day from the corresponding period of 1914-1918 and while it might be unwise to draw any analogy, the increasing demand for War effort, and, for many people, decreasing net incomes, are bound to have effect. We have also to take into consideration the increased cost of maintaining the Society's efficiency.

We must, therefore, be prepared at the close of hostilities to make a great effort to increase our membership.

I rather anticipate that when we have the Bright Collection housed in this room we shall have many visitors to study it and there will be good opportunities for a little useful propaganda on behalf of the Society.

Special Exhibitions on a large scale, a Schoolboy Exhibition, and some judicious advertising should all help to start an increase of effective membership, such, as we can see from the graph of membership, followed the Great War.

There must be very many entomologists who have no idea of the advantages our Society offers. Here are a few:—

1. The spirit of friendliness and the willingness to help one another.
2. The valuable papers and notes read and exhibits made at our meetings in this room.
3. Our Field meetings, when so much may be learnt of practical work.
4. Our typical collections, enabling members to identify specimens.
5. Our extensive library.

I have on some few occasions, mostly when collecting in, or rambling through, the countryside, met an entomologist and in conversation ascertained that he did not belong to any Natural History Society. As I usually try to have a spare programme in my pocket I hand it to him, at the same time, as tactfully as possible, pointing out the advantages of membership of our Society. I describe our meeting place, its interesting and helpful meetings and the valuable collections and library and give him an invitation to pay us a visit. If he does accept the invitation, I try to see that he is made welcome on arrival. In this connection I think we need an officer whose special duty would be to look after visitors and new members, introducing them to others interested in the same branch of study.

I should like at this juncture to make a few comments on our library. I don't know when it was started, but evidently very early in the Society's history as the Council's report in 1878 mentions that Mr Step and Mr Stewart had been successively librarians. Mr Stewart could not have held the office long, as he joined in August 1877 and Mr A. J. Rose was appointed librarian in 1878. We had the pleasure of a visit by Mr Rose a few months ago and he is still active in pursuing his old hobby of collecting butterflies.

The 1878 report mentions that six books were given that year, together with a donation of £2 2s. Two years later there was a similar monetary gift and 7 books were presented, including Wilson's "Larvae of Lepidoptera." Three volumes of McLachlan's "Synopsis of the Trichoptera" were purchased, showing that the Society's interests were

not limited to Lepidoptera. A list of the books in the library was published with the Council's report in 1880 and shows a little over 60 publications of about 120 volumes, together with various pamphlets. It may be interesting to note some of the principal books included in this list:—

Saunders's "British Hemiptera."
 Douglas & Scott's "British Hemiptera."
 Wilson's "Larvae of Lepidoptera."
 Wilkinson's "British Tortrices."
 B. Smith's "Hymenoptera."
 Newman's "British Butterflies and Moths."
 Morris's "British Moths."
 Stephen's "Manual of British Beetles."
 Rye's "British Beetles."
 De Jean's "Catalogue of Coleoptera."
 Brewer's "Flora of Surrey."
 De Crespigny's "New London Flora."
 Shuckard's "Fossorial Hymenoptera."
 Pratt's "Flowering Plants of Great Britain."
 Dawson's "Geodephaga of Great Britain."
 Goss's "Insect Fauna of the Paleozoic Age."
 Stainton's "Tineina."
 Walker's "Diptera."
 Packard's "Guide to the Study of Insects."
 Bates' "Naturalist on the Amazon."
 Wallace's "Malay Archipelago."
 McLachlan's "Trichoptera."
 Wollaston's "Variation of Species."
 Merrin's "Lepidopterist's Calendar."
 Knagg's "Lepidopterist's Guide."

Bound volumes of "The Entomologist," "The Zoologist," and "The Scottish Naturalist."

This list shows the wide scope of the Society's interests even at that time.

Back volumes of the "Proceedings" of the Society show how year by year, by donation and wise purchase, the library has grown.

It would bore you to go into details, but there are a few landmarks worth recording: One in 1881 when the scope of the Society, hitherto confined to Entomology in its title, was extended to embrace all Natural History subjects, and undoubtedly this helped in part the great influx of new members at that time. In 1889 another catalogue was published in the "Proceedings" and it shows that the Society had then a foundation for a most useful library.

I have mentioned the names of three of our first librarians, and they were followed successively by Mr D. Rice, Mr H. J. Turner, Mr A.

Sauzé, Mr T. W. Dods (who held the office for 23 years), and our present hon. librarian, Mr E. Syms.

Year by year the book-shelves had become more and more crowded and new bookcases were soon filled. Some unglazed cupboards became crammed full of unbound Journals, Proceedings of other Societies, separates, etc., so that if one happened to open one of the cupboards it would often result in a deluge of papers. Our removal from Hibernia Chambers and the necessity of storing the library pending the finding of new headquarters gave an opportunity to sort out the accumulation of years. Some obsolete books were disposed of at the same time, thus easing the book-shelves, and unbound periodicals have been tied up in bundles, so that it is now possible to find a paper if one is specially required.

In one cupboard is a collection of early entomological works, some very valuable and scarce. Being hidden away, they are not so well known to members, but here are the titles of some:—

Percheron. “Bibliographie Entomologique,” 1837.

Fuessly. “Archives de l'Histoire des Insectes,” 1794 (this has some fine plates).

Sepp. “Insects,” 5 vols. with fine plates, 1762.

“Papiliones de l'Europe,” 1779-90, 8 vols.

Dillenius. “Mosses and Corals,” 1768.

Curtis. “British Entomology,” 1823-40, 8 vols.

Donovan. “British Insects,” 8 vols. letterpress and 1 vol. plates.

Charpentier. “Subfam. Libellulinae (Dragonflies),” 1840.

“Linnean families of Insects” (Barbut), 1785.

Humphreys. “British Butterflies,” 1859.

Humphreys. “British Moths.”

Chenu. “Natural History,” 3 vols.

Many of these books are from the Ashdown Bequest in 1919. I cannot trace any details of this bequest in the “Proceedings” and perhaps it might be well if particulars of the most important volumes were published.

Unbound periodicals in the cupboards include:—

First International Congress of Entomology.

Entomologiska Tidskrift, Uppsala, Sweden.

Annales and Bulletin Société Entomologique de France.

Entomologische Mitteilungen, Berlin.

The Vasculum.

Proceedings and/or Transactions of various local Societies (some incomplete, unfortunately) such as Perthshire, Torquay, Hastings, Norfolk and Norwich, Isle of Wight, Bournemouth and the Essex Naturalist.

Our most efficient hon. librarian published in last year's “Proceedings” a “List of Authors of the Papers read before the Society,” and,

possibly, some details of unbound periodicals, etc., would be useful if a similar course could be adopted.

I do not know whether many members are aware that Mr. Syms has compiled a card index to the library and perhaps when the War is over and funds allow it may be possible to publish a Catalogue.

I have not attempted to prepare a technical paper for this occasion, as most Presidents have done on relinquishing office. It is not my forte and in any case war conditions have made it impossible to carry out any research—in books or in the field—and I trust you will forgive me inflicting this form of Address upon you.

I have to thank you all for your forbearance during my occupancy of the Chair and the Officers and Council in having made my position less arduous.

It only remains for me to welcome our new President, Mr S. Wakely, an expert lepidopterist and popular with all; he will, I know, fill the position with distinction. May it fall to his lot to announce that we may light our lamps, take out our treacle pots, and resume our active studies in a countryside at peace.

RECORDS AND FULL DESCRIPTIONS OF VARIETIES AND ABERRATIONS.

Exhibited at the Annual Exhibition of the South London Entomological Society.

Compiled by S. G. CASTLE RUSSELL and HY. J. TURNER for publication in the *Entomologist's Record* and in the *Proceedings* of the Society.
Plts. VIII, IX.

MR B. W. ADKIN.—*Parasemia plantaginis*, L. A cabinet drawer showing considerable variation and a novel method of arrangement. *Polygonia c-album*, ab. *dilutus*, Fwk., ab. *suffusa*, Fwk., a var. with blue spots on hindwings and two barred vars. *Aglais urticae*, L. Three ab. *nigra*, Tutt, two ab. *alba*, Cosm., one ab. *semi-alba*, Fwk., two *semi-nigra*, Fwk., one with deep black margins figured by Frohawk and another. *Nymphalis polychloros*, L., one pale, one figured by Frohawk, one with spots on hindwings, and one with broad border. *Nymphalis io*, L., two ab. *semi-ocellata*, Fwk., one ab. *exocellata*, Weym., and one with black ocelli. *Vanessa atalanta*, L., one with narrow band, one with forewings suffused with red, one with brick red bands and one with pale bands. *Vanessa cardui*, L., one ab. *inornata*, Brams., one pale, one suffused, and one with five spots on forewings.

MR H. W. ANDREWS.—A large number of Diptera with wing markings, to illustrate a paper read 11th September 1941.

DR K. C. BLAIR.—(1) A living Longicorn beetle a native of Southern Europe, *Morimus funereus*, Muls., the specimen was previously exhibited by Mr T. R. Eagles at the meeting on the 8th May last, and has since fed on twigs of various trees, oak, sallow, ash, hawthorn, etc. It was found in a garden at Enfield shortly before that date. (2) Living specimens of the so-called bee-louse described by Kirby in 1802, recently hatched from the eggs of the oil beetle, *Meloë violaceus*, Marsh. The eggs were obtained in June by Mr Hugh Main, so the little larvae will have to hibernate before the time of their normal appearance on flowers in April and May. From these they get carried by bees into their nests, in which they undergo the rest of their metamorphosis. (3) Carded specimens of the triungulin larvae of *M. violaceus*, Marsh, and *M. proscarabaeus*, L., for comparison, together with the adult beetles.

DR B. M. BLOOD.—*Hymenoptera parasitica* (Chalcididae), a folio of drawings and microscope slides.

MR A. A. W. BUCKSTONE.—*Polygonia c-album*, L., a long series bred from Ashted ova, September 1941; the ground colour of uppersides being pale brown inclining to yellow and quite distinct from either the

dark brown of the normal autumn brood and the lighter colour of the summer generation. The markings of the undersides took the usual autumn form, but the colour in the majority of the insects was brown instead of the usual black. The parents from which the ova were obtained were of the usual summer form, ab. *hutchinsoni*, Robs., and over 1000 butterflies emerged, of which only 31 were of the typical autumn form. *Argynnis* (*Brenthis*) *euphrosyne*, L., from Ashted, Surrey, 19th June 1941. A female, upperside almost entirely black. A male, upperside cream colour. A male, underside markings very indistinct. *Aricia agestis*, Schiff. (*astrarche*, Bergstr.), a series from Fetcham, Surrey, May and August 1941, showing variation in the number, size, and arrangement of spots on the undersides. *Apocheima hispidaria*, Schiff., taken at Epsom, 18th March 1941, having the forewings yellow in colour and being of an exceptionally large size. A series bred from Wimbledon larvae which varied in colour from typical to deep black. Living larvae and pupae of *Colias croceus*, Frery., from Fetcham ova.

DR G. V. BULL.—A series of *Zygaena filipendulae*, L., with three confluent vars. A completely xanthic example of *Maniola jurtina*, L.; a *Pieris napi*, L., ♀ with a very faint blotch on left forewing; two *Heliothis peltigera*, Schiff., bred from ova laid by a ♀ taken on Valerian at dusk in his garden, 25th June. The ova hatched 3rd July, and the first imago emerged 7th August.

COLONEL V. R. BURKHARDT.—*Argynnis euphrosyne*, L., a yellow male (upperside). A male *Argynnis paphia*, L., almost entirely black, a similar female and several forms of male and female ab. *confluens*, Splr., the black male and female are referable to ab. *melaina*, D'Aldin. *Limenitis camilla*, L., several forms of *semi-nigrina*, Fwk., and an underside of *nigrina*, Weym., *Argynnis aglaia*, L., a male example of ab. *charlotta*, Haw., and several undersides with additional silver markings, and two with all silver markings absent. *Plebejus argus*, L., a lilac-tinted male and one with the greater area tinted lilac; an ab. *striata*, an intersex, ab. *sagittata*, and other forms. All the specimens from the New Forest, 1941.

MR S. A. CHARTRES.—Aberrations of *Polyommatus* (*Lysandra*) *coridon*, Poda, including ab. *striata*, Tutt, ab. *radiata*, Corv., females, and male forms of ab. *livida* and ab. *pulla*, uppersides and undersides of ab. *digitata* and ab. *obsoleta*, Tutt, etc. *Polyommatus* (*Lysandra*) *bellargus*, Rott., a female with heavily radiated forewings (ab. *radiata*, Gasch); another example with six stripes on left forewing and one on each hindwing on a pearly white ground; another with elongated spots on all four wings on white ground colour, one with hindwing heavily radiated, one with six radiations on each forewing and one with six radiations only on left forewing. Also a male with six radiations on each forewing, and an ab. *obsoleta*, Tutt. *Polyommatus icarus*, Rott., a female with broad white border extending around outer margins and

bases of forewings. *Satyrus galathea*, L., a specimen with forewings nearly suffused with black, lunules on hindwings grey; another with black border of hindwings very deep and the white lunules entirely missing. *Argynnis selene*, Schiff., an aberration with black spots on forewings joined, forming two heavy blotches, another with radiated markings on all wings, and one with heavily marked borders to all wings. *Aglais urticae*, L., an example with costal spots united, the white spots being enlarged and with melanic hindwings, another with heavily banded forewings and one with elongated blue lunules. *Syrictus malvae*, L., var. *taras*, Meig., and aberrations of *Maniola jurtina*, L. All the above insects were taken in East Sussex and at Royston, Herts., in 1940-41.

MR H. H. CLARKE.—*Argynnis paphia*, L., two male forms of ab. *confluens*, Spul. A male with black central areas and border spots forming streaks, a female heavily blotched with black and a male also blotched with black. *Limenitis camilla*, L., a *semi-nigrina*, Fwk., all from the New Forest, 1941.

MR F. D. COOTE.—Aberrations of *Mimas tiliae*, L., taken at Carshalton.

MR W. G. FINNIGAN.—Lantern slides and photographs of various natural history objects.

MAJOR FREMLIN.—Aberrations of *Aglais urticae*, L., bred some 40 years ago, showing the effect of various acids and fumes to which the larvae and pupae had been exposed.

MR F. T. GRANT.—Exhibited the following Coleoptera: *Ontholestes murinus*, L., found on and in garden vegetable refuse, 21st June-22nd September 1941 (plentiful). *Ontholestes tessellatus*, Geoff., found on and in garden vegetable refuse, 7th July to 22nd September 1941 (14 taken).

DR H. G. HARRIS.—*Limenitis camilla*, L., ab. *nigrina*, Weym., ♂; *Argynnis paphia*, L., f. *valezina*, Esp., ab. *confluens*, Splr., and a cabinet drawer showing specimens of *Maniola jurtina*, L., arranged to illustrate the various degrees of aberration, mostly females.

MR C. N. HAWKINS.—Communicated the following notes on his exhibit: "On the 9th November last year I exhibited two melanic *Ennomos quercinaria*, Hufn., and 12 non-melanic specimens (3 females and 9 males) of the same brood bred from ova of a strain initiated by Mr Frank Lees in 1934, and I then said there was a suggestion that the heterozygote of the melanic form was that with very heavily shaded cross lines, since that was the one which had always been selected as the non-melanic parent in different generations of this strain, which otherwise had had to depend for its continuation on two very fortunate

'chance shot' pairings in two successive years. I also said that I had good batches of eggs from both the melanic females which had been associated with some of the well-shaded males of the same brood (some of the 12 non-melanic males mentioned above) and that I hoped to find out something more definite about the heterozygotes in due course (see our *Proceedings* for last year (1940), pp. 17/18). The ova proved to be fertile, but many failed to hatch and only 9 larvae (all of one brood) reached maturity and pupated. One pupa and a male died and the remainder produced the specimens shown, i.e. two melanic females, four non-melanic females, and two non-melanic males. It will be noted that one of the non-melanic females is a very pale specimen almost without brown irroration, and with no trace of dark shading to the cross-lines while the others, and the two males, vary in the amount of irroration and shading. They are indistinguishable, in fact, from specimens of a non-melanic strain and since these non-melanics must of necessity be heterozygotes for melanism it is clear that this melanic form is a true recessive and that the heterozygotes cannot be distinguished from normals. In view of this it is a very remarkable coincidence that the heavily shaded non-melanics, selected for breeding purposes in this strain, have so often proved to be, in fact, heterozygous for melanism. The presence of the two melanic females in the brood now shown serves to emphasize this point."

CAPT. R. A. JACKSON.—*Maniola jurtina*, L., a series showing pale forms, one xanthic, a ♂ and a ♀ with ground colour fawn. They were taken on high ground near Bishop's Waltham. *Aphantopus hyperantus*, L., a short series of undersides showing the variation in markings which has occurred this summer (1941). *Pararge aegeria*, L., three ♀♀ var. *egerides*, Stdgr., from Forest of Dean of the first brood with large wings and very bright coloration. *Coenonympha pamphilus*, L., two large females from Dorset where the females appear to be much larger this year. *Argynnis (Brenthis) selene*, Schiff., an underside male aberration and two second brood specimens taken 31st August. *Argynnis aglaia*, L., a pair showing darkening of the basal area. *Polygonia c-album*, L., one with the C almost missing and the other with it very prominent and forming almost a closed circle. *Acosmetia caliginosa*, Hbn., a series of wild taken forms from S. Hants, 2nd, 8th, and 15th June. *Plusia chryson*, Esp., four specimens bred from Test Valley larvae. *Monima (Taeniocampa) populi*, Fb. (*populeti*, Hb.), a series from the exhibitor's garden showing variation in ground colour from pale to dark.

MR F. V. L. JARVIS.—*Pieris napi*, L., a series illustrating the connection between pattern factors and hibernation factors from his own experiments in this direction. (See *Proceedings of South London Entomological Society*, 1941-2.)

On behalf of Mr J. Newton of Sunderland, Mr Jarvis exhibited plates and descriptions of a brood of *Aglaia urticae*, L., prepared from details supplied him:—"On 5th July 1941 fourteen young larvae were





FORMS OF *AGLAIS URTICAE*. L.

collected from a web and reared under normal conditions on nettle. Pupation took place between 20th and 25th July. Emergence began on 14th August. The first seven imagines were dark orange-red with heavy markings. Amongst them was the ♀ ab. C, which is referable to *polaris*, Stdgr., with additional dusky shading between the second and third black costal blotches. Then on 17th August, at 2 p.m., ab. A emerged, followed shortly by ab. B. A heavy thunderstorm was in progress but no significance is attached to this fact. Both specimens were slightly deformed in the hindwings. A and B are extreme modifications of the form *ichnusoides*, Selys-Lng., and *nigra*, Tutt, respectively, and in addition to the obvious markings show the following peculiarities: ab. A ♀: lunules (on hindwings only) are pale lilac with a corresponding dull lilac continuous band on the underside. The under surface is mainly blackish brown with the exception of a pale buff blotch in the centre of the forewings. Ab. B ♂: upper surface—The apical spot is pale blue followed by four deeper blue blocks. The heavy black submarginal band extends along the hind and inner margin to the base of the wings. Hindwings have a purple sheen. Under surface—Forewings almost normal but hindwings are a fairly uniform dark brown. The remaining five pupae failed to emerge and nothing could be ascertained about their possibilities. A suggestion is that these five carried lethal genes especially as the two extreme forms were slightly deformed. Mr Newton, however, does not support this view, but gives a verdict of 'accidental death' as he had to remove all the pupae from the cage to take on a vacation. However this brood is of unique interest as it is an authentic record of the relationship between these extreme aberrations, the commoner ab. *polaris* and the normal form. Possibly it is a pairing between one individual carrying a melanic (*polaris*) factor and another with a '*radiata*' factor; the combination of these factors allowing the other recessive factor to become apparent." (Plt. VIII.)

[Note by S.G.C.R.—The fact of the thunderstorm occurring during emergence is interesting, and I think should be taken into consideration in view of the known influence of thunderstorms on other species.]

MR H. A. LEEDS.—35 specimens of *Polyommatus icarus*, Rott., *Aricia agestis*, Schiff., and *Plebejus argus*, L., coinciding with aberrations described in pages 139 and 140 of the *L. coridon* "Monograph;" and 20 *Lycaena phlaeas*, L., mostly taken prior to 1941. Also 18 *Strymon pruni*, L., captured in 1941: ♂ uppersides, abs. *progressa*, Tutt; postsinis-decrescens; major and minor. ♀ uppersides, abs. *excessa*, Tutt; *aurosa*; postsinis-aurantiaextensa; major and minor. Homoeosis, the second division of right hindwing with a patch of underside bright scaling and white edged black spot reproduced on upperside. ♂ underside, ab. *postdex-transformis*. ♀ undersides, abs. *fulvescens*; *pallidula-fulvescens*; *postsinis-partimflavescens*; *postsinis-sagittata*; *postsinis-decrescens*; ♂ and ♀ *postdex-lutescens*. Except where "Tutt" is shown the terms are from "Monograph of *coridon*." (Tutt's sizes for *Strymon*

pruni, of major, above 32 mm., and minor, below 25 mm., are unsuitable, quite one-third taken *wild* exceed 32 mm., whilst my smallest are: ♂ 25 mm., ♀ 26 mm., and only one of each during 50 years' collecting in Hunts. Those exhibited were based on: major, ♂ above 34 mm., ♀ above 36 mm.; minor, ♂ below 28 mm., ♀ below 30 mm. Mr Leeds advocates that these revised limitations be recognized.)

MR H. MAIN.—Triungulin larvae of *Meloë violacens*, Marsh. The eggs were deposited last spring and the larvae will have to wait until next spring for their further development.

THE REV. J. N. MARCON.—*Argynnis paphia*, L. Seven examples of confluent forms and three melanic specimens referable to ab. *melaina*, D'Aldin. *Limenitis camilla*, L. (*sibilla*, L.), one ab. *nigrina*, Weym., and one *semi-nigrina*, both species from the New Forest, 1941. *Brenthis* (*Argynnis*) *euphrosyne*, L., a confluent form. *Brenthis* (*Argynnis*) *selene*, Schiff., four aberrations: both species from Sussex. *Argynnis cydippe*, L. (*adippe*, L.). A heavily banded female from the New Forest, 1940. *Euphydryas* (*Melitaea*) *aurinia*, Rott., a melanic female bred 1940. *Aglais urticae*, L., an extreme form with a continuous black wedge extending in a triangle from the first black costal spot in discal cell right round to the inner margin. *Maniola jurtina*, L., three xanthic forms, two ♀♀ and one ♂, Sussex, 1940-41. *Coenonympha pamphilus*, L., a homoeotic example, Sussex, 1940. *Lysandra* (*Polyommatus*) *coridon*, Poda. Six examples of ab. *fowleri*, South; males: one ab. *plumbescens*, Tutt, ♂, one ♂ ab. *livida*, Tutt, ♂ and ♀ ab. *glomerata*, Tutt, one ♂ ab. *alba*, Tutt. *Polyommatus icarus*, Rott., ab. *striata*, Tutt, ♂ (*radiata*, Rebel). *Lysandra bellargus*, Rott., an extreme radiate female ab. *striata*, Tutt, with white ground. The radiations on the forewings extending from the obsolete border almost to the base of the wing; the radiations on the hindwings are small. Another example has the radiations only half developed. Another female with brown ground colour, had long radiations on the hindwings and short ones on the forewings. All above from Sussex, 1940-1941.

MR A. N. MORLEY.—Aberrations of *Lysandra* (*Polyommatus*) *coridon*, Poda, taken at Folkestone and near Maidstone, including a melanic male upperside, a melanic male underside and a male ab. *biarcuata*, Tutt. *Boarmia rhomboidaria*, Schiff. (*gemmaria*, Brahm.). Males and females of the form ab. *australaria*, Curt., and five examples of the black form ab. *rebeli*, Aign. Nine examples of *Bryophila* (*Metachrostis*) *muralis*, Forst. (*glandifera*, Hb.) from Romney Marsh.

MR L. W. NEWMAN.—*Colias croceus*. Varieties of this species and one ab. *helice*, Hb., of the *obsoleta* form. All caught in the lucerne fields, Bexley, in September.

MR G. B. OLIVER, on behalf of MR G. H. OLIVER.—A few recent captures. *Argynnis* (*Brenthis*) *selene*, Schiff. An extreme ♂ aberra-

tion of the normal forewing spotting, only the second and fourth costal remain, the costa beyond the latter clouded with black lunules elongated and spotless. Hindwings: Basal two-thirds black, outer third with large black lined lunules. Underside: Forewings unevenly marked with black blotches, hindwings olive buff with large silver lunettes, the whole area rayed by the dark veinings; Hants. *Coenonympha pamphilus*, L. A pale creamy buff male, Middlesex. *Pieris napi*, L. A male with all normal black markings on fore and hindwings replaced by greyish-brown (as in ab. *ganerew*, Frwk., *Leptidea sinapis*, L.), Bucks.

MR L. G. PAYNE.—A collection of native British Ferns in a large picture frame.

MR A. J. PONCHAUD.—An extreme form of *Lysandra (Polyommatus) coridon*, Poda, with radiations on all four wings (ab. *radiata*), Salisbury district.

MR C. G. PRIEST.—A series of British Lepidoptera bred and captured during the season of 1941.

MR A. RICHARDSON.—Six drawers of British Lepidoptera taken or bred in 1939-40-41:—(1) A bred series of 40 *Parascotia fuliginaria*, L., with two preserved larvae, Berks. Bred series of three *Agrotis lucerneae*, L., and one larva, Conway. Series of 90 *Agrotis ashworthii*, Dbldy., and two larvae, bred from wild larvae taken at Conway, April 1940. Bred series of 36 hybrid *Lycia hirtaria*, Clrck., ♂ (London) × *Nyssia zonaria*, Schiff., ♀ (Conway). Bred series of eight (four ♂ and four ♀) hybrid *Poecilocampa lapponaria*, Bdv., ♂ (Perth) × *L. hirtaria*, Clrck., ♀ (London). Bred series of eleven *Ortholitha umbrifera*, Prout, and one larva, forced in December 1939, from the Forest of Dean larvae. A melanic *Acronicta psi*, L., larva taken at Rannoch, September 1940; first recorded specimen from that locality.

(2) Series of 25 *Ectropis consonaria*, Hb., ab. *waiensis*, Rchsn, and including for comparison two typical specimens, Forest of Dean. Series of *E. consonaria*, Hb., ab. *nigra*, Bnks., Gloucester. Bred series of *Boarmia repandata*, L., ab. *nigra*, Tutt, Delamere, with eight bred specimens from Rannoch and Forest of Dean for comparison, also two ab. *conversaria*, Hb., bred from Loch Maree. Series of twelve *Ectropis crepuscularia*, Hb., ab. *nigra*, Th.-Mg., Gloucester. Series of twelve *E. crepuscularia*, Hb., ab. *delamerensis*, B. Wht., Delamere. Series of seven *Perizoma blandiata*, Schiff., taken 11th August 1941, Forest of Dean (second brood ?), with fourteen taken at Rannoch, 15.vi.39, and seven taken in N. Wales, 12.vi.38, for comparison. Series of nineteen each of *Ortholitha umbrifera*, Prout, and of *O. mucronata*, Scop., taken on the same ground in the Forest of Dean on 18th June and 25th July respectively. Series of *Lampropteryx otregiata*, Metclif., South Devon. A specimen of *Lygia suffumata*, Schiff., ab. *porrittii*, Robs., taken in

the Forest of Dean and two intermediates bred from the same. A very heavily black-banded aberration of *Chloroclysta siterata*, Hufn., Forest of Dean. A series of seven *Perizoma taeniata*, Steph., Witherslack. A specimen of *Psodos coracina*, Esp., Braemar. A series of 43 *Hydriomena ruberata*, Frr., taken off pollard willow trunks in Gloucestershire.

(3) A series of 250 *Erannis leucophaearia*, Schiff., picked off tree trunks on Sunday, 25th February, 1940, in the Forest of Dean and including 90 ab. *merularia*, Weym.

(4) A series of 45 *Oria musculosa*, Hb., taken in Salisbury district, 1st and 2nd August 1940. A series of ten *Oligia (Miana) versicolor*, including first two British specimens both melanic varieties, Forest of Dean, Oxford and Norfolk Broads. Typical specimen of *O. (M.) literosa*, Haw., ab. *aethalodes*, York. Series of five *Bryophila muralis*, Forst., ab. *impar*, Warr., Gloucester. Two specimens of *Heliothis dipsacea*, L., from Salisbury and the Breck. Series of three *H. maritima*, Gras., Dorset. Series of over 130 *Sarothripus revayana*, Scop., picked from 900 beaten out in the winter of 1940-1, chiefly in Gloucester, and including abs. *ramosana*, Dup., *stonianus*, Curt., *atrata*, *brunnescens*, *lichenodes*, *canescens*, *dilutana*, Hb., *ilicana*, Fb., *rubescens*, *nigripunctata*, *rosea*, *afzeliana*, *adusta*, *nigricans*, and *melano-sticta*. Series of 23 *Epione vespertaria*, Fb., York. Series of 18 *Zygaena achilleae*, Esp., Argyle. Series of 18 *Z. exulans*, Hoch., Perth. Series of 18 *Z. purpuralis*, Brün., N. Wales. Series of eight *Coenonympha pamphilus*, L., also five cream-coloured and one with white patches, Forest of Dean, and two with aberrant spots on underside of forewings from N. Wales. One specimen of *Adopoea thaumas*, Hufn., ab. *intermedia*, Tutt, Dover. One specimen of *Polyommatus coridon*, Poda, ab. *syngrapha*, Kef., Stroud. Two specimens of *Aricia agestis*, Hb., var. *artaxerxes*, Fb., Rannoch. Series of four *A. agestis*, Hb., Witherslack. One specimen of *Leptidea sinapis*, L., ab. *ganerew*, Frwk., Forest of Dean. One specimen of *L. sinapis*, L., ab. *erysima*, Bork., Forest of Dean. Two *Polygonia c-album*, L., vars. one copper coloured and one with melanic hindwings, Forest of Dean.

(5) Bred series of 20 *Drymonia chaonia*, Hb., New Forest. Bred series of 18 *Spilosoma urticae*, Esp., Norfolk Broads, also a spotless specimen taken at Wicken. Bred series of 20 *Callimorpha dominula*, L., ab. *bimacula*, Oxford. *Acronicta menyanthidis*, View., Rannoch. Series of four *Acronicta myricae*, Gn., taken and bred, Rannoch. A pale aberration of *Noctua rubi*, View., York form, taken at Wicken. Bred series of twelve *N. ditrapezium*, Bork., and two larvae, Witherslack, and a bred specimen from Conway. Bred series of twelve *N. triangulum*, Hufn., and one larva, Conway. Series of twelve *N. stigmatica*, Hb., and two larvae, Oxford. Two specimens of *Catocala sponsa*, L., New Forest. Series of 34 *Triphaena comes*, Hb., abs. *curtisii*, Newm., *rufa*, Tutt, etc., bred from wild Forres larvae.

(6) Bred series of four *Triphaena fimbriata* Schreb., Stroud. Two specimens of *Agrotis raveda*, Hb., Oxford and Lincoln. One specimen of





Type



Medio-
Nigra



"A"



"B"

CALLIMORPHA (PANAXIA) DOMINULA, L.

Det. C. R.

Leucania unipuncta, Haw., taken in bred condition in S. Wales on 15th October 1938. Two bred specimens of *Callimorpha dominula*, L., ab. *bimacula*, with defective black scales giving a mottled appearance. A series of twelve *Xylomiges conspicillaris*, L., including one ab. *intermedia*, Tutt, and a series of six *Mamestra rectilinea*, Esp., Rannoch. A series of 40 *Phoethedes captiuncula*, Tr., Arnside. A series of 28 *Tapinostola hellmanni*, Evers., Lincoln. A series of 20 *Arenostola brevinella*, Fenn., Norfolk Broads. A varied series of 20 *Gypsotea leucographa*, Hb., including an obsolete specimen, Forest of Dean. Series of 15 *Cosmia paleacea*, Esp., from York, with three from Aviemore for comparison. Series of 13 *Atethmia xerampelina*, Hb., N. Wales. A series of *Dasycampa rubiginea*, Fb., Berks. A series of 15 *Xanthia croceago*, Fb., and one larva, taken and bred from Forest of Dean. Two specimens of red form of *T. gracilis*, Fb., New Forest. A series of four *Plusia bractea*, Fb., Forres. A series of *P. chryson*, Esp., Hants.

MR C. RIPPON.—A brood of *Callimorpha* (*Panazia*) *dominula*, L., containing some unusual aberrations. The exhibit consisted of the greater part (45 specimens) of a brood sixty in number bred from ab. *medio-nigra* ♀ captured wild; so the male parent is unknown. Of the 60 imagines, 18 were typical, 16 *medio-nigra*, 16 "B" and 10 "A." "B" (Plt. IX) closely resembled the form to which Dr Cockayne originally gave the name of *basi-nigra*, Cykn., the only white spots on the upper wing being in the apical area, small in size and in some cases only two in number; the under wing was similar to that of *medio-nigra*. In "A" the upper wing was like that of "B" except for a triangular orange spot midway along the wing near the costa, while the underwing resembled that of the type. The black in the underwings tended to be heavy in the whole brood, especially in the "B" form.

MR S. G. CASTLE RUSSELL.—*Argynnis* (*Brenthis*) *euphrosyne*, L. A melanic male form, fore and hindwings heavily suffused and clouded with black, N. Forest, 1941. *Argynnis paphia*, L. Seven male forms of ab. *confluens*, Spul. Two males suffused with black referable to ab. *melaina*, D'Aldin. A female form of ab. *confluens* and two females heavily clouded with black (ab. *melaina*). *Limenitis camilla*, L. A male and a female *nigrina* and three *semi-nigrina*. *Argynnis cydippe*, L. (*adippe*, L.). Two underside forms. *Plebejus argus*, L. A female underside ab. *striata* and other underside forms. *Pararge megera*, L. A very pale straw-coloured male. All above from New Forest, 1941.

MR W. R. SHERRIN.—A very interesting collection of British grasses.

MR J. A. STEPHENS.—British Coleoptera. A. Taken in the Chatham area between 1939 and October 1941 in a well-wooded and secluded place on a farm. *Paganaeus bipustulatus*, F., *Amara anthobia*, Va., both rare: taken under stones, etc.; *Opilo mollis*, L., rare (hawthorn blossom and hazel); *Pogonochaerus dentatus*, Fc. (old ivy); *Stiliculus fragilis*, Gr.,

in abundance; *Acidota crenata*, F. (one specimen); *Pseudopsis sulcata*, Nw.; *Agathidium rotundatum*, Gy.; *A. nigrinum*, St.; *Xylophilus populneus*, Pz. (two specimens), all being rare. *Epipolus caliginosus*, F. (one only), usually found only in London district. Found hibernating in a large heap of straw in the winter of 1940-41.

B. Taken on growing potatoes in the town allotments, etc. *Homolopia ruricola*, F., local and rare. *Langelandia anophthalma*, Ab. This very rare species was first discovered by the Rev. Theodore Wood at St Peter's, Broadstairs, in potatoes: then after 50 years I found it in my own back garden under roots of flowers and at the bottom of decayed chestnut fencing in 1935 (two specimens), and in the following years in plenty. The present exhibit was taken only a few days before the exhibition. It has also been taken recently in Windsor Park by Mr Donisthorpe. *Anomonatus 12-striatus*, Ml., found in company with the above. *Bembidion 4-maculatum*, L., rare; taken in the bed of a dry stream, Borstal.

C. The following were taken in Cobham Park. *Pogonochaerus bidentatus*, Th. *Trachodes hispidus*, L. *Thanasimus formicarius*, L., taken under bark of a small fallen oak branch. *Throscus carinifrons*, Bon., rare. *Liodes cinnamomea*, Pz., rare, from leaves under above branch. *Hernoticus serratus*, Gy. (one only), very rare (hornbeam). *Aulonium trisulcum*, Gf. (elm). *Synchita juglandis*, F. (one only), very rare (beech), from under bark of trees. *Leptura scutellata*, F. (hornbeam). *Platycis minuta*, F., rare (beech). *Platypus cylindrus*, F. *Cychrus rostratus*, L., in decaying hornbeam. *Sphindus dubius*, Cy., found in old tree stumps. *Prionus coriarius*, L., from the heart of a large ash tree when being felled. *Coenopsis fissirostris*, Wa., from under leaves. *Tritoma bipustulata*, F.; *Triplax lacordairea*, Cr.; *Diphyllus lunatus*, F., and *Orchesia undulata*, Kr., all rare, found in fungi. *Podabrus alpinus*, Pk.; *Stenochorus meridianus*, Pz. (blackthorn); *Balaninus glandium*, Mm. (oak); *Rhagonycha translucida*, Kry., from beating. *Dirrhagus pygmaeus*, F., very rare (one only); this has not been previously taken in Kent; by sweeping ferns and short herbage. *Smicronyx reichei*, Gy., rare; sweeping herbage at Darenth Wood. *Lestiva pubescens*, from Sandling near Maidstone. *Hydrous piceus*, L., from Gravesend; *Aromia moschata*, L., from Snodland.

MR H. G. TUNSTALL.—*Argynnis paphia*, L. Three males, three females, and three examples of var. *valezina*, taken in the New Forest, 25.7.39; *Brenthis (Argynnis) euphrosyne*, L., a specimen with cream patches on the forewings, taken at Box Hill, 4.6.39; *Aricia agestis*, Schiff. (*astrarche*, Brgstr.), an example of var. *salmacis*, St., taken at Epsom, 9.9.41; *Laspeyria (Aventia) flexula*, Schiff., one bred from Box Hill larva, 12.6.39, and another from Ashted larva, 15.6.39. He also showed a copy of an old cartoon entitled the "Entomologist." The figure was made up of wings, legs, bodies, etc., of various orders and of various stages.

[Note by S.G.C.R.] This cartoon is one of three published by C. Tilt, Fleet Street, January 1830. G. Spratt del. Printed by G. E. Madeley. The other two are entitled the "Conchologist" in which the figure is made up of shells, and the "Mineralogist" in which the figure is made up of various minerals. I possess a copy of each.

The face (side view) is a pleasant youthful one, the only human element. The head is covered by a large grasshopper as a cap with extended forward antennae; at the back of the head is a long bodied dragonfly perched below the bent hind legs of the grasshopper and with half extended wings and curved abdomen. Covering where the ear should be is a large dark beetle. The neck is hidden by a larger beetle with a row of black spots on each side of the elytral suture. It has a black head coming below the chin of the face. The two arms are much magnified larvae, one dominated by green colour, the other by red and black. Each arm is extended, one forward the other half backward; each holds an old-fashioned implement of capture. The whole body is made up by a huge *caja*, right wing extending to the right knee, which is marked by a bronze beetle; the left wing reaches to the left shoulder but covered by a sort of Saturniid moth, which forms a V-shaped waistcoat over the chest. The left thigh and knee are formed by a nondescript fly, whose body covers the knee. The portion below these limbs is formed by the black yellow-banded bodies of Hymenoptera simulating banded stockings and swathed in flimsy wings. These two limbs are settled on beetles for shoes, one a blue-black and the other a red-black beetle. The superscription is: The Entomogist. Published by C. Tilt, Fleet Street, January 1830. G. Spratt del. Printed by G. E. Madeley.

MR HY. J. TURNER.—A few of the more common Rhopalocera from the Island of Java (Indo-Malay Region). *Papilio memnon*, L., a very widespread species in this Region. The ♂ is tail-less in the whole area and practically without local variation whereas the ♀ is extraordinarily variable and usually tailed. In Seitz's work some 30 different forms of ♀ are described. The Java ♀ form, *achates*, Sulz., is a large conspicuously marked tailed form. In the adjoining island of Borneo the form there is a tail-less one. *Papilio paris*, L., is tailed in both sexes; it is not so variable as the last except in and around the large and conspicuous green area of the hindwing and in the metallic dusting of the wings. It is extremely common generally in the Region. The Javan form is ssp. *gedeensis* Fruh., a rather plain form. *Papilio helenus*, L., is a very plain black and white species; the discal area of the hindwing has a large tripartite white area. It is a very common forest insect. The Javan form is ssp. *enganius*, Dohrty., and occurs in Borneo and Sumatra also. Of the two Pierids shown *Anaphaeis java*, Sprrm., is a species which shows considerable local and seasonal variation. The underside of the Javan form *magniplaga*, Fruh., is strikingly coloured. The other Pierid is the plain yellow *Salatura panda*, Godt. On other islands this species varies in depth of ground colour and also in the varying extent of the black borders.

MR S. WAKELY.—Exhibited the following species which had been taken or bred during the present season. A series of *Spilosoma lutea*, Hufn. (*lubricipeda*, L.), from Clapton, London, many of which showed markings approaching ab. *fasciata*; *Orthosia xerampelina*, Hubn.; *Crambus contaminellus*, Hubn.; *Polychrosis littoralis*, Curt.; *Laspeyresia woerberiana*, Schiff.; *Carcena quercana*, Fabr.; *Mompha propinqua*, Staint.; *Elachista cerusella*, Hubn.; *Ornix guttea*, Haw., and *Tinea misella*, Zell. (*insectella* Fb.), all from Norwood. *Peronea aspersana*, Hubn.; *Polychrosis fuligana*, Haw.; and *Leucoptera lotella*, Staint., from the Ashted Field Meeting, and a series of *Depressaria carduella*, Hubn., the pupae of which had been sent to him by Mr L. J. Ford from the North of England.

LIEUT. N. A. WATKINS.—*Polygonia c-album*, L., a ♀ var. *hutchinsoni*, Robs., Somerset, August 1934, upperside ab. *nigra*, underside ab. *sagitta-album*, Frwk., 1938; this is the form figured by Frohawk and described by him in "Varieties of British Butterflies," 1938, figs. 2-3, p. 103. The references in that book are erroneous, and should read as above. A ♂ ab. *semi-nigra*, Forest of Dean, 1934; and a thinly scaled form giving a purplish shade to the upperside, bred Somerset, 1938. *Aglais urticae*, L., a ♂ ab. *nigra*, Tutt, extreme form, Bucks, 1935; a ♂ ab. *nigra*, Wilts. Downs, 1939; a ♀ *semi-nigra*, Ireland, 1916, and a ♂ ab. with both forewings and one hindwing white, remaining hindwing normal, 1938, Wilts. *Melitaea athalia*, Rott., a ♂ ab. *eos*, Haw., E. Kent, 1936; a ♂ ab. *navarina*, Selys-Long, Essex, 1937. *Brenthis (Argynnis) euphrosyne*, L., with red rust coloured underside, N. Devon, 1941; a melanic ♂ form, Northants. *Brenthis (Argynnis) selene*, Schiff., a ♂ ab. *margo-striata*, Fwk., N. Cornwall. This is figured by Frohawk in "Varieties of British Butterflies," plate 24. A ♂ ab. *margo-striata*, S. Cornwall, 1839; both from a small sized race, the males of which have a tendency to this form and the females to melanism. *Euphydryas aurinia*, Rott. ♂ and ♀ forms from Wilts and N. Devon, including a melanic male (Wilts) and a unicolorous ♂ ab. *fasciata*, N. Devon. *Argynnis aglaia*, L., a ♂ ab., New Forest, both forewings and one hindwing heavily splashed with white. *Heodes (Rumicia) phlaeas*, L., a ♂ ab. *alba*, a ♂ ab. *radiata*, a ♂ ab. *obsoleta*, Tutt, and a ♂ ab. underside with costal spots beginning to striate. All from N. Cornwall, 1939-40. *Aphantopus hyperantus*, L., a ♂ and ♀ ab. *caeca*, Fuchs, Wilts, a ♂ and ♀ ab. *lanceolata*, Shipp., N. Devon, a ♂ ab. *obsoleta*, Tutt. *Colias croceus*, Frery., a series of var. *helice*, Hb., colour ranging from *pallida*, Tutt, to *chrysothemiformis*, Vrt., a ♂ and ♀ with discal spots on underside, lanceolate. *Plebejus argus (aegon)*, Schiff., a gynandromorph figured by Frohawk in "Var. of Brit. Butt.," plt. 28, fig. 4. *Lysandra (Polyommatus) coridon*, Poda, a series including abs. ♂ *fowleri*, South, *ultrafowleri*, *striata*, Tutt, *juncta*, etc., and ♀ *semi-syngrapha*, *syngrapha*, *caeca*, *radiata*, *juncta*, etc., also two females with splashes of blue colouring. *Lysandra (Polyommatus) bellargus*, Rott., a series including ♂ *obsoleta*, Tutt,

and extreme blue forms. *Lycaena arion*, L., a ♂ *obsoleta* upperside and two approaching *obsoleta*; three ♀ uppersides with bottom spot radiated (*I. nigrum*), a ♀ dwarf form underside, ab. *retrojuncta*. *Polyommatus icarus*, Rott., a series including *caeca*, Tutt, and *striata*, Tutt, and some Irish forms. *Pieris napi*, L., a series including an albino ♀ bred Donegal, 1936, figured by Frohawk, plt. 37, fig. 1, forms of ab. *hibernica*, Schmid., and *citrona*, Fwk., banded forms from Donegal and Caithness, and extreme suffused and *bryoniae* forms, Caithness.

BARON DE WORMS.—(A) Series of British Lepidoptera taken and bred in 1941, including:—*Coenonympha tullia*, Mull. (*typhon*, Rott.), taken at Cairnsmuir, Galloway; *Hemaris tityus*, L. (*bombylifomis*, Ochs.), taken in the New Forest; *Sesia vespiformis*, L., bred Salisbury district; *Hepialus velleda*, Hbn. (*fusconebulosa*, Dg.), taken in Galloway; *Bombyx rubi*, L., males from Salisbury area; *Callimorpha dominula*, L., bred from Salisbury district; *Eumichtis protea*, L., Salisbury; *Xylophasia polyodon*, Hufn. (*monoglypha*, L.), melanic examples taken in Galloway; *Xanthia aurago*, Fb., Salisbury area; *Acosmetia caliginosa*, Hb., taken in Hants; *Boarmia consonaria*, Hb., taken in Forest of Dean; *Scotosia transversata*, Hfn. (*rhamnata*, Schiff.), from Salisbury, bred; *Thera variata*, Schiff., Salisbury area.

(B) Uncommon species and aberrations of (a) Butterflies taken and bred during 1941. *Apatura iris*, L., a male taken near Salisbury, 27th July, two males and one female bred from same area; *Pararge aegeria*, L., a male with yellow spotting from Wye Valley; *Maniola tithonus*, L., specimens with extra spots and one with bleached forewing; *Maniola jurtina*, L., examples of xanthic forms; *Eumenis semele*, L., a heavily marked form from Salisbury; *Lysandra* (*Polyommatus*) *coridon*, Poda, a ♂ ab. *fowleri*, a ♀ var. *syngrapha*, two unusually coloured males and some *obsoleta* undersides; *Lysandra* (*Polyommatus*) *bellargus*, Rott., blue forms of the ♀ and abs. *ceronus*, *obsoleta*, Tutt, and *parripuncta*, Aigur., undersides from Salisbury. *Polyommatus icarus*, Rott., an ab. with radiated stripes on all four wings (ab. *radiata*), Salisbury, 7th September; also lightly marked undersides; *Hesperia comma*, L., a ♀ with wings bleached on one side. (b) Moths.—*Agrotis simulans*, Hufn., a specimen taken in Salisbury, 7th September; *Taeniocampa gothica*, L., a dark ♀ form, Salisbury; *Catocala sponsa*, L., a ♀ form, New Forest; *Arctia caja*, L., a lightly marked ♂; *Taeniocampa munda*, Esp., spotless forms from Salisbury area; *Boarmia consonaria*, Hb., five examples of ab. *vaiensis*, from Wye Valley.

(C) The following exhibits of Lepidoptera taken during 1939 and 1940 have already been reported in the "Proceedings." *Triphaena comes*, Hbn., a drawer illustrating the difference between the Northern and Southern races together with a series bred from a ♀ taken in Forres, 1939; *Callimorpha dominula*, L., a specimen bred in 1940 with albinistic colouring and devoid of black markings on hindwings; *Polyphoca flavicornis*, L., an example taken in 1940 with heavy black mark-

ings, from Berks; *Lysandra (Polyommatus) coridon*, Poda, a ♂ with pale grey underside, ab. *obsoleta*, Tutt, taken in 1940.

Series of moths taken or bred during 1939:—*Noctua depuncta*, L., Forres; *Crymodes exulis*, Lef., f. *assimilis*, Dbldy., Rannoch; *Plusia bractea*, Fb., Forres; *Aporophyla lutulenta*, Bork., f. *lunenburgensis*, Frr., Rannoch; *Moma alpium*, Osb. (*orion*, Esp.), Kent; *Eumictis (Epunda) lichenea*, Hb., bred, Swanage; *Noctua castanea*, Esp., Rannoch; *Agrotis cursoria*, Bork., Forres; *Larentia flavicinctata*, Hb., Rannoch; *Crocallis elinguaris*, L., Aviemore.

MR N. G. WYKES.—A bred specimen of *Apatura iris*, L.; *Limenitis camilla*, L., an ab. *nigrina*, Weym.; *Maniola tithonus*, L., a bleached upperside and several with additional spots; *Maniola jurtina*, L., a ♂ upperside without forewing apical spot and various xanthic ♀ forms; *Plebejus aegon*, L. (*argus*, Schiff.); a series of underside minor forms; *Aricia agestis*, Hbn., a ♂ underside with obsolete border; *Lysandra (Polyommatus) coridon*, Poda. Many aberrational forms including: male uppersides—*latimargo*, *augustimargo*, Tutt, *fowleri*, South, *viridescens*, Tutt, *metallica*; female uppersides—*syngrapha*, H.-S.; *partim-transformis*. Male undersides—one with striated forewings, *minor*, Tutt; with striated forewings and *obsoleta* hindwings; *glomerata*, Tutt, *caeca*, *fowleri*, South, and many obsolete forms. Female undersides—one with forewings striated (extreme), one with forewings striated and hindwings obsolescent, one *tri-i-nigrum*, one with forewings *i-nigrum*, Tutt, and hindwings obsolete, and many *obsoleta* forms.

Heodes phlaeas. ♀ forewing upperside with all the black submarginal spots extended outwards into the dark brown border; underside with less extreme marking, and the hindwings are normal, Salisbury district, 1941. ♀ with all the orange colour below the median vein of forewing suffused with dark brown scaling, hindwing is normal, Stow, 1940. ♀ with submarginal spots on forewing indicated by mere dots, Chiltern Hills, 1941. ♂ ab. *radiata*, Petersfield, 1939; ♂ and ♀ upperside *obsoleta*, no trace of orange, Petersfield, 1941. *Lycaenopsis argiolus*, ♀ underside, forewing completely obsolete, hindwing almost obsolete, Salisbury, 1941.

FIELD MEETINGS.

Field meetings were held in 1942 as follows:—

26th April—Box Hill.
 11th May—Slough.
 25th May—Horsley.
 7th June—Bookham.
 22nd June—Byfleet.
 5th July—Ashtead.
 20th July—Oxshott.

The numbers attending were, as expected owing to war conditions, small, and no special captures were reported. Owing to the need to economize paper detailed reports of all the meetings are not being published.

Owing to the tragic death at the Oxshott meeting of Mr R. W. Attwood, it was decided to cancel the remaining field meetings to Riddlesdown, Ashtead, and Boxhill, which had been arranged by the Council.

26th APRIL 1941.

MICKLEHAM DOWNS AND BOXHILL.

Leader: F. J. COULSON.

There were present at this meeting about fifteen members and friends, and, although the weather was dull, a pleasant time was spent. Most of the party kept within the Juniper Valley, but a few rambled over Mickleham Downs, and one member as far as Headley. On Mickleham Downs some woodpeckers were observed and *Brephos parthenias*, L., was noted on the wing. On the boles the light forms of *Diurnea fagella*, F., were seen. The lepidopterists in the main party were successful in beating the larvae of *Lithosia deplana*, Esp., and *Boarmia ribeata*, Clk., from the yews. The grasshopper, *Acridium vittatum*, Zett., was noted in the Valley, and one member secured two lizards.

The coleopterists of the party were fairly successful, the principal attraction being the nests of the yellow ant, *Acanthomyops flava*, L., from some of which *Claviger testaceus*, Preys., was obtained in numbers. The little beetle was difficult to see but strangely enough the search by many of the party for a lost bottle containing a number of the beetles proved fruitless. Three other species of Coleoptera, *Lampriodes saginatus*, Grav., *Onthophagus ovatus*, L., and *Astilbus caniculatus*, F., were taken with the ants. A Noctuid pupa and a Geometrid larva about to pupate were also taken in the nests, and in each case

later the imago emerged, being respectively *Agrotis cinerea*, Hb., ♂, and *Anaitis plagiata*, L. (or *efformata*, Guen.), ♀.

Timarcha coriaria, Laich., were frequent crawling amongst the grass and *Brachinus crepitans*, L., occurred under stones. Investigation of moss on the stumps and holes resulted in *Lebia chlorocephala*, Hoff., and *Barynotus obscurus*, F., being secured, and under elm logs *Scaphidium quadrimaculatum*, Ol., and *Quedius lateralis*, Grav., occurred. *Othius punctulatus*, Goeze, was found under bark, and in rotten stumps *Sinodendron cylindricum*, L., were in abundance, with a few *Baptolinus affinis*, Payk. Lastly, in a hard ash log the larvae and pupae of *Pyrochroa serraticornis*, Scop., were numerous and from these the first imago emerged on the 20th of the following month.

THE CYNIPID GENUS ISOCOLUS. (HYMEN.)

By M. NIBLETT.

Read 13th December 1941.

The generic name of the species under discussion appears to have been changed quite a number of times. Kieffer (1) includes them in the genus *Aulax*, which was originated by Hartig in 1840 [*Aylax*] amended by Hartig in 1843 to *Aulax*. The original spelling should be retained. —K.G.B.] but I have not been able to find any record of these species being included under that generic name by Hartig. *Scabiosae*, which is the type, was described by Giraud in 1857 as *Diastrophus scabiosae*, a name adopted by Schenck in 1859 and by Taschenberg in 1866; in 1869 Förster (2) proposed the name *Isocolus*. The specific name *rogenhoferi* was given by Wachtl in 1880, *Isocolus rogenhoferi*, but Mayr in 1882 called it *Aulax rogenhoferi*; *jaceae* was named by Schenck in 1863 *Aulax jaceae*; *fitchi* was described by Kieffer under the name of *Aulax fitchi*.

Bagnall (3) writes of *Aylax rogenhoferi*, syn. *Isocolus rogenhoferi*; again (4) he speaks of *Aylax rogenhoferi* and *Aylax jaceae*, but later (5) he says, "The species found on *Centaurea* and *Serratula* (excepting *phanacis*) would seem to form a natural group, which we here record under the generic name *Isocolus*. *Isocolus scabiosae*, Gir., is the type of the genus to which *rogenhoferi*, *fitchi*, and I think *jaceae* can be referred."

Ross and Hedicke (6) use *Aylax* as the generic name of these species. I have found the galls of all the species and have bred the gall-wasps from three.

Isocolus scabiosae, Gir.—The galls of this species take the form of swellings at the base of the stem of *Centaurea scabiosa*, L. I have found them on Epsom Downs, and at Ashted, Dorking and Woldingham in August and September and have had the gall-wasp emerge in July of second year. The larvae are heavily parasitized at times by Chalcids. Several galls collected on Epsom Downs, 18.viii.34, yielded only 19 Chalcids and not a single *scabiosae*. I paid visits to this area for a number of years but although the plants persist I have never found another gall and am forced to the conclusion that the colony has been destroyed by the action of these parasites. A little later in the same year another series of galls collected at Ashted gave very different results, 1 Chalcid and 37 *scabiosae* emerging from them. The Chalcids emerged in April, May and July of second year.

I. rogenhoferi, Wachtl.—This species is the cause of a considerable swelling on the inner surface of the involucre bracts of *C. scabiosa*. These galls are not visible from the outside of the flower-head and are, I feel sure, frequently overlooked, for judging by my own experience

they are widely distributed and are usually to be found where the host plant occurs. I have had them from Banstead Downs, Banstead Wood, Woodcote, Ranmore Common, Headley; Beachy Head, Sussex; and the Devil's Ditch, Newmarket, Cambs.

The gall-wasp usually emerges in June and July of second year, I had it emerge so for a number of years and was very much surprised when from a few galls collected on 17th August I had two *rogenhoferi* emerge on 28th August and two on 12th September, the remaining galls yielded the insects in the following July. There is no record in existence so far as my knowledge goes of this species emerging in the first year. I have found galls in August and September with emergence holes in them but was under the impression that they were due to Chalcids as I had had these parasites emerge occasionally in those months. The majority of the Chalcids I have bred have emerged in June and July of second year. Kieffer gives May and June of second year as the emergence time of the gall-wasp. This species is also recorded as galling the achenes of the same plant but is I think rare in this position as I have only found one galled achene myself.

I. jaceae, Schenk.—This species causes the achenes of *Centaurea nigra*, L., in this country and other *Centaureas* on the Continent to be considerably swollen. I have found it at Colley Hill, Banstead Downs, Fetcham, Riddlesdown, Park Downs, Epsom Downs; and Sandown, Isle of Wight. I think it safe to assert that it is a rare species. I have bred 48 specimens of the gall-wasp but these have been secured from some thousands of flower-heads of its host-plant. It has emerged in June and July of second year, 4th June being the earliest date and 18th July the latest. Kieffer gives May and June of second year as the emergence times, but I have a strong suspicion that some of these early times of emergence we read of are due to the galls having been kept indoors, and consequently in a warmer temperature than they would obtain in a state of nature. I have tried to keep as near natural conditions as possible by keeping all my breeding material in an unheated shed where it is at times coated with frost in severe weather. I have bred parasites from *jaceae* galls on one occasion only, two Chalcids emerging in July from galls of the previous year.

I. fitchi, Kieff.—The gall of this species was recorded by E. A. Fitch in the "Entomologist," Vol. x, May 1877, as that of "*Isocolus scabiosae*, Gir., a Cynipideous gall-maker new to Britain." The gall (apparently there was only a single specimen) was sent to Fitch by Mr W. C. Boyd, who found it at Topley Pike, Derbyshire, in the autumn of 1875. Fitch evidently bred out the Cynipid and found that it did not quite agree with Giraud's description of *scabiosae*, and feeling rather doubtful about it he sent it to Kieffer, who described it as a new species under the name of *Aulax fitchi*. Kieffer states that he submitted it to Dr Mayr in 1879 who returned it as a *Diastrophus* n. sp. between *scabiosae* and *areolatus*. The gall occurs upon the midrib or petiole of leaves of *Centaurea scabiosa* in the form of a more or less pea-like swelling. I found

the galls on Epsom Downs and at Dorking in August but failed to breed out the insect, two Chalcids emerged in July of second year. I find no mention of its time of emergence and rather think that there are but very few specimens of this Cynipid in existence.

It should be noted that all localities given are in the county of Surrey unless otherwise stated.

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- (3) Bagnall, R. S. (1917). "Entomological Monthly Magazine," October.
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- (5) Bagnall, R. S. (1932). "Scottish Naturalist," January-February.
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THE OCCASIONAL SCARCITY AND ABUNDANCE OF LEPIDOPTERA, WITH SPECIAL REFERENCE TO THE RHOPALOCERA.

By S. G. CASTLE-RUSSELL.

Read 10th January 1942.

This is a subject which has always very much interested me and to which I have given a good deal of observation and consideration in an endeavour to ascertain the causes. The subject is one which invites discussion and, I venture to think, will be of interest to our members.

My remarks more particularly refer to the districts with which I have been familiar during the last 40 years, viz., the Aldershot and Farnham district, the New Forest, East Horsley, Monk's Wood in Hunts, Abbot's Wood in Sussex, localities in Westmorland, Lancashire, and Cheshire, and the downlands in the counties of Surrey, Hants, Bucks, Wilts, and Sussex. Other areas I am not so competent to remark upon, although, from general reports, the same variation in numbers has occurred.

When I first started collecting in 1888 (thanks to encouragement and tuition from Mr F. W. Frohawk, who was a near neighbour of mine) and for a good many years after I found a continuous abundance of nearly all the Rhopalocera. In the copses near Aldershot I have seen *Bithys quercus*, L., in swarms around the small birch trees; at Ascot *Argynnis cydippe*, L. (*adippe*) in immense numbers (in recent years these have been replaced by *A. aglaia*, L.), and in the New Forest in the spring *Lycænoposis argiolus*, L., around the holly trees literally in thousands. In the early nineties all the Argynnids, together with *Limenitis camilla*, L., and *Aphantopus hyperantus*, L., *jurtina*, L., etc., were in extraordinary abundance, and *A. paphia*, L., simply swarmed. *Nymphalis polychloros*, L., also was met with everywhere and the spring excursions of the Society always met with the larvae in plenty. I particularly remember the year 1892. In Ramnor enclosure in mid July, the bramble blossoms were thickly covered with *A. paphia*, and when the sun became temporarily obscured these rose in thousands, as thick as a heavy snowstorm, to take refuge in the tree tops, returning as soon as the sun again appeared. In the previous spring Mr C. Wells told me that, whilst he and his brother were in the rides collecting, his clothes were covered with the larvae of *A. paphia*. The last years of extreme abundance were 1917, 1918, 1919, when the fritillaries throughout the Forest and in other localities swarmed. The following year, 1920, was a very wet one and a season of scarcity, and since then there has been a gradual decline in numbers, and although in some years there was a certain amount of improvement no extreme abundance has recurred. Therefore a period of some 20 years has elapsed without a year of the abundance that used to occur frequently. Of course, some

districts have shown better numbers than others, and I have read reports of abundance, but I doubt if the present generation of collectors can quite realize what real abundance means. It certainly does appear that the seasons many years ago were more favourable for Lepidoptera. If one refers to Edward Newman's works he very frequently refers to great abundance.

As a rule in these later years, even if a species shows signs of picking up in numbers, it does not continue to improve and after a year or two once more falls off, and scarcity again prevails.

I will now refer to certain instances where extreme abundance over a long period suddenly turned to great scarcity, which has been continuous ever since.

At Royston, at my first visit in 1911, I found *Lysandra coridon*, Poda, in the greatest profusion, and I learned from a collector, whom I met, that this extreme abundance had been in evidence in previous years. This condition continued for many years after, and the locality was favoured by large numbers of collectors. My last visit was, I think, in 1928, at the end of August, when all the collectors had departed. *L. coridon* were still in immense numbers but mostly worn, yet in the following season the species was almost rare and they have never become really abundant since—a lapse of over 10 years. Exactly the same thing occurred in localities I worked in Hants, Wilts, and Bucks, and they have not yet recovered anything like the former abundance. The scarcity could not have been caused by failure of the species to endeavour to propagate as in each case during the last period of abundance the insect was still in extreme numbers in a worn condition.

Leptidia sinapis, L.—This insect at one time occurred in abundance in the woods in the Reading district, but at my first visit it had disappeared. This was in 1902. A very well-known collector, the late W. Holland, told me that in the late '80s it was in such extreme abundance that the woods and rides were full of them in several localities near Reading. Yet the following year the species entirely disappeared and to my knowledge has never re-appeared. Holland said that the brothers Waterhouse, who worked the same areas, had a similar experience. On several occasions I have put down numbers of pupae but without result. Mr Philip Graves once bought some 100 pupae from Mr Newman and we put them down in a suitable spot in Woolmer Forest, but although they appeared in some numbers in the following season, I believe they died out then.

Apatura iris, L.—In 1902 this insect was plentiful in the Basingstoke area, and in Pamber Forest I saw the imagines flying around almost every other oak tree. None was to be seen during the following season and it is now practically extinct although specimens have been taken from time to time. In the '90s I also found the larvae in fair numbers in Monk's Wood, Hunts, and saw the imagines in Abbot's Wood, Sussex, in dozens around certain rows of oak trees. In the New Forest the species has been practically extinct for many years. According to

an old note in one of the magazines during the '70s, it was not seen in the Forest for a period of 15 years, after which it re-appeared again in numbers, when one could get as many larvae as one desired from the dealers at 1/- each. In recent years it has appeared in considerable numbers in Surrey and Sussex.

Nymphalis polychloros, L.—This insect I never failed to meet with during my excursions to the Forest in the old days. It seems now to have entirely disappeared and also from other favourite districts. In one Surrey district, where it had occurred year after year in numbers, I once counted over 30 nests of larvae on the willows in one long country lane and every elm tree in the district had larvae on it. Elms, however, were scarce, and willow was the favoured food. I have not seen the insect in that locality for many years although I feel sure that it must still exist there.

Argynnis paphia, var. *valezina*, Esp.—From my own observations this form has increased very much in numbers and distribution in recent years. In the old days a collector considered that he had done very well if he caught a dozen *valezina* during a day's work when the typical forms were plentiful, but this var. is now met with in some of the enclosures in considerable numbers. In one particular enclosure Mr A. E. Burras of Portsmouth will confirm me when I state that the var. was equal to the normal form in numbers in those years when great plenty obtained. Even in more recent years I have during the course of an hour's walk through the rides counted several hundred *valezina*. It has also been reported from other districts where it had not been formerly recorded.

Limenitis camilla, L.—This is another species that has increased in numbers and distribution in recent years. During 30 years' collecting in the Aldershot woods I never saw the insect, but it suddenly turned up one year in large numbers, possibly an immigration from Woolmer Forest, where it was occurring in plenty. It has continued to reside in the Aldershot locality ever since, but only in small numbers.

Polygonia c-album, L.—This is a remarkable example of greatly increased numbers and distribution and there has been no falling off.

Maniola jurtina, L.—This once extremely common butterfly has greatly declined in the New Forest and other woodlands and now seems to prefer the downlands, where occasionally it is abundant, but not every year. For instance, on the downs near Salisbury in 1939, it was in large numbers, but last season exceedingly scarce.

Pararge megera, L., and *P. aegeria*, L.—Both these species were at one time abundant, the latter especially in the Forest but it is not nearly so plentiful now. *Megera* in the old days was common everywhere but is now sporadic in its appearance. I found it once near Blandford in countless thousands in a long lane leading up to a hill camp.

Aphantopus hyperantus, L.—In the old days and even up to recent years this insect was one of the "common objects of the country" in

the Forest and other woods and swarmed every year in the Forest rides. Once I met the late Mr J. F. X. King, who said that he had determined to go on catching specimens until he obtained an example of the var. *lanceolata*, Frwhk. He said that he had caught over 400 in a couple of hours and got one *lanceolata*. He certainly could not catch so many now in the time as during the last three or four years they have become scarcer and scarcer and in many of the enclosures are extremely scarce. Some light is thrown on this instance by the fact that in recent years I have failed to rear any considerable number of imagines, the larvae dying when full fed, evidently through disease as no ichneumons were in evidence. Previously I never had any difficulty in rearing very large numbers.

Lycaena (Maculinea) arion, L.—This insect will, I think, always defy extermination so far as collectors are concerned owing to its habits. It seems prone to shift its breeding ground. It has also peculiar ideas of a suitable time to be on the wing and I have rarely seen it on the wing after 4 p.m., however sunny the weather. Once when collecting at Bude with Messrs C. Wells and E. Mann we were each able to get a series although on arrival we were told that an entomologist had just departed after a week's stay without seeing a single specimen. He was certainly not too early as many of ours were worn. On the last day of our visit, whilst sitting at lunch in a well-known coombe, *arion* suddenly appeared on the wing all around us in considerable numbers at about 1 o'clock. By two o'clock all had disappeared, notwithstanding that the sun continued to shine, and we saw them no more. When first discovered at Bude by the Messrs Waterhouse they were in great abundance and continued so for some years, and covered a wide area. They ultimately became scarce and have never reached the original large numbers. I am informed, however, that occasionally large colonies are found both in this district and in others.

Now to refer to the question of scarcity. There are many reasons for this and taking into consideration the number of enemies that Lepidoptera have and their helplessness it is a wonder that they continue to exist at all. Disease, parasites, spiders, beetles, birds, humans, etc., are continually attacking them. I have not particularly observed that climatic influences greatly affect numbers. Cattle do a lot of harm as they tread down the ground so much. Sheep I have found do not deleteriously affect numbers and I have been very careful to note this: in fact, they are necessary to prevent grass from entirely choking out the food plant where the downlands are concerned. I have time after time seen a flock ranging over the emerging ground of *L. coridon*, whilst the insect was actually emerging in large numbers, but no damage seems to have accrued. Parasites such as ichneumons will alone entirely decimate a colony of *M. aurinia*, and I have observed several instances of this. Disease, too, can decimate species as I have sometimes found to my cost when breeding, and once the thing starts it goes all around and affects different species. Overcrowding will, of course,

produce an epidemic. Birds can do a lot of harm. It has invariably been my experience that in woods where game is bred and strictly preserved, fritillaries in particular can gain no footing and are always very scarce. This I particularly noticed during the last war when in certain highly preserved woods where breeding had been given up and very few pheasants left, the smaller fritillaries, such as *aurinia*, *euphrosyne* and *selene* became quite common, only to disappear after breeding had again commenced after the war. Pheasants and chickens will leave nothing alive on the ground. Sparrows will now freely take larvae of *A. urticae*, L. (at least they do in my own garden), and this seems a recently acquired habit. I have watched a blackbird morning after morning attacking and rarely catching *L. coridon* on the wing and also swallows catching fresh *C. tullia*, Müll., on rising from the ground in the mosses. Last season I rescued a large larva of *Lasiocampa quercus*, L., from the beak of a blackbird. I am told by many collectors that in recent years ichneumons have been beaten in large numbers into the trays.

It is sometimes stated that over-collecting is responsible for declining numbers, but my own experience does not support this theory and except in certain instances no really convincing evidence is brought forward. The statement is often made by a collector who visits a locality in order to obtain a series of a particular insect and because he fails, either for the reason that it happens to be a season in which the insect is scarce, or he is too early, or too late, he at once assumes that over-collecting is the cause. In all those instances of abundance and decline that I have previously mentioned there can be no possibility of over-collecting owing to the very large numbers, and we must look for other causes. No one is more intolerant of unnecessarily killing insects than I am, and I have no desire to defend those who callously kill large numbers of insects simply on the chance of obtaining aberrations, but I have not for some long time met any collectors who amass large numbers of them in cyanide bottles for examination. Some of us had the courage to protest against the practice. Nowadays the use of a chiffon net enables collectors to examine insects in the net and let them go if not required.

Some years ago the Royal Entomological Society issued a list of butterflies that in their opinion required protection from collectors. This list included *Melitaea cinxia*, L., *M. athalia*, Rott., *L. sinapis*, L., and *L. arion*, L., amongst others. Now I have had a good deal of experience with regard to all these species, which occur in well-known localities. I feared that one result of this list would be that collectors would feel impelled to secure series of the insects specified before they became quite extinct. This I have reason to believe actually occurred, and much persecution resulted. Now what was the result? Instead of becoming scarcer and scarcer, each of the species actually increased in numbers and in very recent years has been more plentiful than it ever was, except perhaps in an especially bad season. What can one

deduce from this? Does it confirm the astonishing theory put forward by Dr Guard Knaggs very many years ago (when the question of over-collecting was much to the fore), viz., that excessive collecting is advantageous because nature impels the insect, which realizes its scarcity, to propagate more energetically to meet the impending shortage? I once met an entomological student in the Isle of Wight who from his own experience with *M. cinxia* fully agreed with this theory.

In the case of *Zygaena meliloti*, Esp., in the New Forest, there seems little doubt about the species being exterminated by over-collecting. I am told on good authority that one dealer simply sat on the ground all day during the emergence and took every specimen that came out. In such a limited area as that in which the insect occurred it could not possibly survive such greediness. A man in the signalling box near expressed to me the view that the disappearance of the insect was due to the greatly increased railway traffic of recent years, the result being that the area was continually covered with black smoke from engines which were stoked in the vicinity, but I do not think this theory very convincing. There are no doubt other instances known where the disappearance of a species has been undoubtedly caused by over-collecting in a limited area.

I have made many endeavours to re-establish or establish certain species of Rhopalocera by putting down large numbers of imagines or ova in suitable localities where food plant was plentiful. They appear the following year but then die out unless augmented by a fresh supply of imagines or eggs. *Euphydryas* (M.) *aurinia*, Rott., in particular, as soon as they appear on the wing seem anxious to find some other area to reside in and even the larvae will be found wandering a long way from their birthplace, and consequently starving to death. In the Aldershot Woods *P. aegeria* was once a common insect, but one year it disappeared and has not been seen there for some 30 years.

I consider that the condition of woodlands has a great deal to do with scarcity. In those woods where the copses are cut at regular intervals, usually 7 or 8 years, the fritillaries and other species are generally abundant. When the copses are neglected and not cut at all the trees grow so thick that the food plants such as violet, etc., entirely die out, and the female has to find other areas in which to deposit its eggs, and if these do not exist owing to the general neglect of the wood, the butterfly has either to get away or be content with the small area of the rides. In the New Forest the trees have grown so much taller and thicker on the edge of the rides that the latter are in most instances sunless after 3 p.m. The whole area is much darker than it used to be and not conducive to insect life. Of course, some enclosures are better than others. Bramble blossoms have been ruthlessly cut down everywhere and a keeper told me that he had instructions to cut down all honeysuckle as it was bad for the trees. Ivy, which really is harmful, seems to be left to choke the trees. The cutting down of the trees now

going on in the Forest will, I think, ultimately improve it as a collecting ground, especially as most of the trees being removed are pines.

As regards the downlands, the future is not so rosy. Many of them are being ploughed up. Others are being taken over for camping purposes and after the war will be left in a derelict condition, covered with concrete bases from which huts have been removed and, of course, the original fauna destroyed. Already one of my best and most prolific Downs has been taken over for an aerodrome.

To sum up, I am convinced that the variation in numbers of insects generally is chiefly influenced by the parasites that prey on them and by the condition of their habitats. When the larvae become extremely abundant, the parasites have the opportunity to increase and in due course become so numerous that the number of butterflies is largely reduced. In due course, when the parasites become very numerous, there is not enough food for them and they in their turn become scarce and enable the butterfly to become numerous again. Probably this procedure has been going on for countless years. After parasites I place neglected woodlands.

From information received I gather that the scarcity of butterfly life has been equally apparent on the Continent, and is not confined to Great Britain. In the '90s, when abundance was general, we had a series of hard winters and fine summers. I remember that we used to get ice skating around London every winter. It would seem that hard and prolonged winters are favourable to insect life. The very fine and hot summers that I remember especially were in 1887, 1892, 1893, 1895, 1897, 1911, 1917, 1918, 1921, and 1935.

Mr F. W. Frohawk writes as follows:—"I can confirm all Mr S. G. Castle-Russell's remarks on the abundance and scarcity of butterflies during the last half century.

"New Forest.—My first visit to the New Forest was in 1888. During the night of 17th-18th July a violent thunderstorm occurred with very heavy rain. At 8 a.m. it quite cleared up and was followed by bright sunshine, but at 4 p.m. another thunderstorm broke over the Forest. At 8.30 a.m. the Forest became like a hot-house, everything steaming from the heat of the sun on the dripping wet foliage. I shall never forget the impression it made upon my friend and self.

"Insects of various kinds literally swarmed. Butterflies were in profusion. *A. paphia* were in hordes in every ride, the var. *valezina* was met with every few yards, as were *A. aglaia* and *A. adippe*. *L. camilla* were sailing about everywhere. On a bank under a willow in the sunshine was a large female *A. iris* with wings expanded, evidently washed out of the willow by the heavy rain. *N. polychloros* was of frequent occurrence. Flies in annoying swarms were everywhere. *T. bovinus* were loudly buzzing round us all day, and the detestable clegs piercing us with their needle-like proboscis were far too numerous. The same abundance of insect life occurred until towards the end of the 'nineties' and a general decrease was apparent for many years.

“The exceptional dry hot season of 1893 was outstanding by the very early emergences of all kinds of butterflies, being weeks earlier than usual. It was in 1893 that *N. polychloros* was in abundance, sitting on the tree trunks in the sun and with closed wings in the rides, at a distance resembling fallen fir cones. It was in these years that the white-spotted *paphia* were of common occurrence. One afternoon in 1900 I saw three on the bramble blossoms within 50 yards, but these are now scarce as are several other species comparatively.”

I am very sorry that owing to existing conditions I am not able to be present in person to read this paper, as I should have much liked to listen to the discussion that may ensue. No doubt much of what I have said will meet with disagreement, but after all I am only giving my own experience, which, of course, must necessarily be limited.

THE ONION FLY (HYLEMYIA ANTIQUA, MEIGEN).

By T. R. EAGLES.

Read 12th June 1941.

I have, in view of the times, chosen a garden insect of interest to vegetable growers. Few are better known than the Onion Fly and the extensive planting of onions, following on the great shortage, will perhaps lead to a serious outbreak. The insect has three broods, and it may happen that the earlier broods, after multiplying in plots belonging to careless or ignorant growers, will later become a serious danger to all.

Hylemyia antiqua, Meigen, is also known as *Phorbia cepetorum*, Meade. In Balachowsky and Mesnil's book on insects injurious to cultivated plants in France it is referred to as *Chortophila* (*Crinura*) *antiqua*. The name we use is relegated to the synonyms among which appears also the name *Chortophila ceparum*, Meig. The specific names *cepetorum* and *ceparum*, though evidently not to be used, had the advantage of indicating the association of the insect with onions, for *coepa* or *cepa* is Latin for onion. The fly is devoted to the onion, but apparently does not feed on all species of *Allium*. I say this because I have for several years grown four or five species of ornamental *Allium*, and a friend of mine has grown them extensively for many years, without their having been attacked by the Onion Fly. Most of these ornamental *Allium* possess very strongly the characteristic smell of the once familiar vegetable.

The Onion Fly belongs to the family *Anthomyidae*, in which the larvae of many species are vegetable feeders. It is, therefore, not surprising that other pests of crops belong to this family; for example, the Cabbage Root Fly (*Chortophila brassicae*, Wied.), the Mangold Fly (*Pegomyia betae*, Curt.), and the Wheat Bulb Fly (*Hylemyia coarctata*, Flm., or *H. hyoscyami*, Pz.). Flies of this family also appear as pests in the ornamental garden, for we have the Carnation Fly (*Hylemyia brunnescens*, Zett.). Anthomyids are close to Muscids and the Onion Fly is not unlike that most familiar of Muscids, the House Fly. The members of the two families can be distinguished by looking at the venation at the end of the wing. If two very noticeable veins come together or nearly do so then the fly is a Muscid, but if they do not then the fly, if otherwise of the House Fly type, is probably an Anthomyid. Put more technically, Cell R 5 is closed in one case and open in the other.

Looking through the Ministry of Agriculture and Fisheries' reports on insect pests of crops in recent years, we find that the Onion Fly is always with us but not always very seriously. From 1928 to 1931 it was a bad pest in several parts of the country and in Staffordshire growing had to be abandoned to a considerable extent. The year 1934 is

marked as bad. We gather that the vicinity of large towns is especially liable to infestation. Under the auspices of the Royal Society of Horticultural Technology, in conjunction with the Chamber of Horticulture, an investigation was carried out in 1920 and following years and reference is made to the seriousness of the pest to market gardeners in Lancashire and Cheshire. The same story comes from the northern parts of the U.S.A. and from Canada. And the French authors already referred to say it spreads right across the northern part of Europe and across Russia as far as Astrakan. Further south the insect appears to give no trouble. The same is true of the southern parts of the U.S.A.

The eggs are laid on or near the onion plants and are of the familiar white elongated type. Once they hatch little can be done and so the chief way of controlling the pest is to prevent egg laying by the use of a repellent. The old-fashioned idea of planting parsley between the rows so that the smell of the parsley will mask that of the onions is not despised by our Ministry, although the American and French authorities ignore it. A great number of repellents have been tried. Some of the most successful, such as naphthylamine, are too expensive. Horticultural naphthaline or calomel spread on the soil is, I think, the usual garden remedy.

The Americans and Canadians seem to prefer to try to prevent egg-laying by spraying the plants with Bordeaux mixture and lubricating oil stock emulsion.

The idea of attracting the insects to poisoned baits has been extensively tested by Americans and Germans. Various sugars and alcohols were tried with disappointing results. More success was obtained with pieces of onion chopped up and poisoned with sodium fluoride.

The winter is spent as a pupa in the soil and thus rotation of crops is a check on the pest. Certainly it would be inviting trouble to try to grow onions on ground where there had been an infestation the year before.

The life-history of the insect is as follows:—Flies emerge from the pupae in May and June. They feed on the nectar of flowers and the sap of trees. They are not active and can be easily captured. After a week or so they pair and egg-laying commences. There are three main broods and much overlapping. With the onset of Autumn the pupae begin to over-winter. It is said that the eggs can be found on the plants and that periodical searching is worth while. The larva is of the familiar type, tapering towards the head and wide at the hind end. The mouth is furnished with black hook-like jaws. Spiracles are borne at the hinder end. It has been shown that the larva carries with it various bacteria which break down the tissues of the onion into a more or less liquid condition. In this state the food is more readily assimilated by the larvae. Of these bacteria the most important is *Bacillus carotovorus*. Diptera, of course, commonly make use of bacteria in this way. After feeding for a fortnight or three weeks the larvae pupate,

and, except for those that over-winter, the pupal stage lasts about a fortnight.

Natural enemies of the fly in the way of ichneumons, braconids, etc., are not important enough to have encouraged any attempt to use them as a biological control. But one of these enemies is of rather special interest entomologically. It is a Staphylinid beetle, *Aleochara bilineata*, Gyll. The larva of this beetle makes its way into the pupa of the fly and after one feed changes its appearance from an active campodeiform larva to a sluggish eruciform one and becomes almost incapable of movement. It completes its development in the puparium of the fly. This phenomenon of hypermetamorphosis has long been known in the case of the oil beetle, *Meloe*, but has only comparatively recently been discovered in the case of the Aleocharid beetles. These useful beetles attack the pupa of the Cabbage Root Fly in the same way.

The Onion Fly is the subject of leaflet No. 31 issued by the Ministry of Agriculture and Fisheries. It is issued separately and is also to be found in the "Collected Leaflets on Insect Pests of Farm and Garden Crops." There is a figure of the fly, of the larva, and of the damage done. In 1922 Benn Bros. Ltd. published under the auspices of the Royal Society of Horticultural Technology, in conjunction with the Chamber of Horticulture, a book dealing with the Onion, Carrot, and Celery Flies. This has a number of good illustrations showing the life-history of the flies, the damage done, the parasites, etc. The American book, "Destructive and Useful Insects," by Metcalfe and Flint (McGraw Hill), of which a second edition has very recently appeared, gives a short account with illustrations. In Volume II of "Les Insectes nuisibles aux Plantes Cultivées" (Balachowsky and Mesnil, Paris, 1936), there is an exhaustive account, but the illustrations deal only with the damage and the detailed structure of the larva. The life-history of the Aleocharid beetle is dealt with by Imms in his "Text Book" and in "Recent Advances in Entomology" by the same author.

COLEOPTERA OF BOOKHAM COMMON.

By F. J. COULSON.

Read 10th July 1941.

The area known as Bookham Common, which includes Greater and Little Bookham Commons and Banks Common, has been the scene of many Field Meetings of the Society and on many of these occasions the coleopterists of the party have listed a fair number of species of Coleoptera, which have been secured. The aggregate, however, form in my opinion but a very small percentage of the species that would be found to occur on the Common if systematically worked by a resident coleopterist. The records in the published "Proceedings" (approximately 163 in number), the captures made personally on my own occasional visits to the area, other records, and the species from the locality I have seen or which have been taken by friends, number approximately 668 (or 25 per cent. of the total Surrey Coleoptera) which in my opinion is far short of the true total. Doubtless there are many generally common species unrecorded and others have been overlooked, as on each of my personal visits the presence of many interesting additional species has been revealed. A survey therefore of the possibilities of the locality would be a useful aid for future visits of the Society, and, in addition, the availability of a local list would afford much assistance to the field worker, particularly to those who desire to study the early stages of Coleoptera. The preparation of such lists is in my mind one of the functions of a Natural History Society.

Except for enthusiasts the usual swampy conditions of the locality prevent much field work during the early months of the year. But the advent of April and slightly drier conditions enables the collecting season to be begun in earnest. Even in February stripping the bark from fallen branches and sticks lying in swampy grass patches may result in *Lathrobium longulum*, Grav., and *L. brunnipes*, F., with many other Brachelytra being secured. About April the flat subcortical species as *Phloeonomus pusillus*, Grav., *Thectura cuspidata*, Er., *Silvanus unidentatus*, F., *Cerylon fagi*, Bris., and many others can be seen beneath the bark of felled oak, often in abundance, provided the under layer is moist. Another flat species, *Phloeostiba planum*, Payk., is found later under the moist bark of living hornbeam broken branches in company with *Placusa denticulata*, Shp. Under drier bark I have taken the larvae of *Ctesias serra*, F., but was unsuccessful in rearing the imagines. In the tunnels made by *Dryocaetes villosus*, F., under the bark of oak logs, the small *Euplectus piceus*, Mots., and *Stenichnus collaris*, Müll., are not infrequently observed. *Baptolinus affinis*, Payk., a pretty species, has the habit of running about on the surface of the bark of the boles and stumps. Sap or damp fungoid conditions on stumps also

produce many good species but tree felling giving workable stumps is not extensive and it is only very occasionally (except at the present time when many broken branches are to be found), a suitable stump is located and a good bag of timber frequenting species obtained. In this connection the stumps of recently cut saplings should not be ignored, as *Epuraca unicolor*, Ol., and many other Clavicorns there reside. The accumulation of rabbit excrement on the stumps often forms the hiding place of *Philonthus splendens*, F., a species which usually occurs on dead rabbits. Coleopterous larvae frequently obtrude themselves upon our notice whilst bark working, and many species, as *Athous villosus*, Four., and *Melanotus rufipes*, Hb., I have only noticed in this locality in the larval state.

The chain of ponds in the centre of the common is usually the spot where on Society meetings the members congregate and consequently the largest number of species have been obtained in this vicinity. From early April onwards to September aquatic beetles and those that favour a damp habitat abound. In April the van of the host consists mostly of *Cymbiodyta marginella*, F., *Philydrus coarctatus*, Gredl., and *Anacaena globulus*, Payk., in the ponds, and *Agonum mülleri*, Hb., *Lathrobium quadratum*, Payk., *Feronia minor*, Gyll., and *Bembidion dentellum*, Thms., on the damp margins. In May and June the use of the pond net will produce besides those mentioned such species as *Helochaeres punctatus*, Shp., *Hydroporus memnonius*, Nic., and *H. pictus*, F., *Agabus sturmi*, Gyll., and *A. didymus*, Ol., and the generally commoner pond species. Altogether 37 per cent. of the *Hydradephaga* and 25 of the *Palpicornia* aquatic species to my knowledge inhabit these ponds. The *Haliphus* genus is represented by 9 species, including *H. fulvus*, F., and *H. flavicollis*, Stm., and *Hydroporus* by 9 species, including *H. erythrocephalus*, L., and *H. tessellatus*, Drap. The *Helophorus* group of the *Palpicornia* is well represented, but careful work is required to sift out the smaller species. Occasionally *Colymbetes fuscus*, L., *Rantus exsoletus*, Four., or *Hydaticus seminiger*, Deg., can be secured, whilst the interesting *Hygrobia hermanni*, F., often proclaims its presence in the net by its characteristic squeak. A search for the curious larva of the latter and those of the *Haliphus* genus would no doubt be successful as the species represented are common at times. From the water weed the little *Tanysphyrus lemnae*, F., can generally be sorted out and in a stagnant woodland pool *Hydraena riparia*, Kug., has been observed.

As the water recedes in the summer months the plants in the centre become accessible and the sweeping net used vigorously may secure *Bagous luteiventris*, Gyll., which is fairly common, *B. limosus*, Gyll., and numerous *Stenus* species of which 29 occur on the Common, the rarest being *S. fornicatus*, Steph., *S. incrassatus*, Er., and *S. picipennis*, Er. Sweeping in the eventide the rushes on the exposed flats produce numerous the little *Bryaxis sanguinea*, Rb., the black variety of which occasionally occurs. Amongst the *Equisetum* the yellow-tailed *Hippuriphila modeeri*, L., and the particoloured *Atomaria mesomelaena*, Hb., occur

in numbers. *Dyschirius aeneus*, Dej., occurs commonly in August when *Bembidion rupestre*, L., has also been taken.

The moss at the sides of the pond and the low vegetation, both wet and just moist in the portions of the margin almost submerged, has been worked by the members to the considerable amusement of the mere spectators. The method employed is to press down the dampish tracts with the boots and wait a few moments for the bewildered inhabitants to appear on the surface under the supposition that they are removing themselves from danger. The stooping position one has to assume may be unpleasant in its consequences but the bag secured is generally good, especially when the sun is shining. Normally on the surface *Elaphrus cupreus*, Dufts., various Bembidions and Feronias are roaming on their lawful occupations. *Feronia caerulea*, L., and *F. macra*, Marsh., both occur in this situation and *Agonum viduum*, Panz., is very common. Pressure at the roots disturbs as well those who remain longer periods beneath as *Lathrobium* species and the smaller *Brachelytra*, as *Cousya maura*, Er. Pressure at the roots of rushes in particular also causes the appearance of *Agonum gracile*, Gyll., and other *Agonum* species and occasionally *Badister sodalis*, Duft., *Philonthus fumarius*, Grav., *Acupalpus consputus*, Dufts., and *A. dorsalis*, F., besides many others of the pond margin frequenters. Some unexpected captures as *Bagous lutulosus*, Gyll., and *B. tempestivus*, Hb., have been made by squeezing the thick moss over a waterproof sheet. The damp decaying leaves and rubbish at the edge of the ponds harbour *Acrognathus mandibularis*, Gyll., *Stilicus rufipes*, Germ., and three of the *Paederus* species. Any flat board or broken branch lying in the wet edge has many inhabitants, whilst the roots of the grasses near the edge, besides many others, afford a hiding place for *Sitona cambrica*, Steph. It is worth while also to clear out the accumulations of dead leaves at the entrances of rabbit burrows on the banks and investigate the drift of the ditches for such inhabitants as *Bryocharis cingulata*, Mann., *Agonum livens*, Gyll., and *Othius punctulatus*, Goeze.

The layer of leaves on the surface in the woods should be pushed aside with a trowel and, after a short interval, on the soil, various species can be seen, some lying dormant as *Olivina fossor*, L., others as *Notiophilus rufipes*, Curt., *Leistus fulvibarbis*, Dej., *Asaphidion flavipes*, L., and *Loricera pilicornis*, F., running over the surface. Occasionally specimens of *Quedius nigriceps*, Kr., and *Q. maurorufus*, Gr., and other *Quedii* occur.

When the drying of the ponds has exposed stretches of mud adjacent to the clumps of plants, species such as *Heterocerus fenestratus*, Thnb., and *H. marginatus*, F., *Platystethus alutaceus*, Thm., and *P. cornutus*, Grav., can be taken as they move on the surface of the mud. The former genus takes wing very readily in the sunshine and is often missed. In addition crawling on the surface occur many *Brachelytra* such as *Trogophiloeus* (four species occur commonly), *T. neobisnius*, *T. procerulus*, Grav., and *Actobius cinerascens*, Gn. The little damp spots and the pools

at the outflow of the ponds at this season are the haunt of numerous pond species often in numbers in the restricted waters and around these occasionally occurs *Bembidion quadripustulatum*, Serv.

Along the sides of the connecting ditch, which runs through the flats covered with rank vegetation, and similar spots, the use of the sweep net is the best method. Amongst the buttercups can be found *Hydrothassa aucta*, F. Of course if plants are sufficiently high, especially when in bloom, shaking into the net is preferable to sweeping. The ditch vegetation harbours, often in numbers, such species as *Psylliodes chalconera*, Ill., *Phytonomus adpersus*, F. (with var. *alternans* Ste.), and *Ceuthorhynchus nasturtii*, Germ. The *Phaedon* species, *P. cochleariae*, F., and *P. armoraciae*, L., occur in numbers, and there may be some connection in the occurrence of *Saprinus virescens*, Payk., as this species is thought to feed upon *Phaedon* larvae. When the water in the ditch is sufficiently low it is interesting to immerse the plants with the hand; then can be seen such species as *Bembidion unicolor*, Chaud., striking out vigorously, others as *Prasocuris phellandrii*, L., drifting to the nearest haven, unlike myself, evidently regarding the matter as a tedious interlude. Crawling under the bank of the ditch *Liosoma deflexum*, Panz., occurs in numbers, together with occasional *Cercyon ustulatus*, Preys., *Lathrobium multipunctum*, Grav., *Bledius fracticornis*, Payk., and two *Lesteva* species, *L. longelytra*, Goeze, and *L. heeri*, Fauv. Occasionally on the flats *Gymnetron veronicae*, Germ., *Poophagus sisymbrii*, F., *Brachygluta fossulata*, Rb., and *Longitarsus holsaticus*, L., are swept. The true *Gymnetron beccabungae*, L. occurs on the willow bushes and on the low vegetation by the pond sides. The Cuckoo flower in bloom can be gently shaken for *Ceuthorhynchus cochleariae*, Gyll., and on the rushes occur *Nanophyes gracilis*, Redt., and *Reichenbachia juncorum*, Rb.

From the aquatic vegetation by the ponds can be swept many species. The three *Eirirrhinus* species, *Notaris scirpi*, F., and *Prasocuris junci*, Brahm, occur, and *Anisosticta 19-punctata*, L., a Common insect, occasionally shows minor confluence of spots in this locality. *Donacia thalassina*, Germ., was formerly taken here but *D. simplex*, F., and *D. vulgaris*, Zach., are the only *Donacias* I have observed. *Stenus solustus*, Er., *Encephalus compicans*, Westw., and *Platystethus capito*, Heer, are occasionally taken and the interesting larva of *Helodes minuta*, L., swept off the plants.

By beating the bushes ringing the ponds good results are usually obtainable. The willows are most frequently worked, giving *Orchestes salicis*, L., *Dorytomus rufulus*, Bed., and *Rhamphus flavicornis*, Hb. *Orchestes pilosus*, F. (with var. *nigripes*, Fowl.), and the *Coeliodes* species occur on the young oaks. The blue varieties of *Chalcoides* are not infrequent in some spots and ab. *fragariae*, Deg., of *Rhynchites aeneovirens*, Marsh., and also *Magdalis ruficornis*, L., occur on the hawthorns on some parts of the Common.

Beating the larger trees does not usually result in a good bag. The oaks are tenanted by *Leiopus nebulosus*, L., *Agrilus angustulus*, Curt., *Balaninus villosus*, F., and *Anobium fulvicorne*, Stm. In addition *Abdera biflexuosa*, Curt., and *Dromius 4-signatus*, Dej., can sometimes be jarred from the broken ends of the branches. *Molorchus minor*, L., and *M. umbellaturum*, Stch., have both occurred, whilst *Pogonochaerus hispidus*, Ahr., can be beaten from almost any holly. *Malthinus flaveolus*, Payk., and *M. fasciatus*, Fall., both occur. In the rides the aspens are fruitful of such species as *Chalcoides aurea*, Geoff., and *Polydrosus flavipes*, Deg., and on aspens or sallow occasionally the galls caused by the larva of *Saperda populnea*, L., can be observed. The rare *Anthonomus pubescens*, Payk., has been taken on the furze growing on the open common and *Ochina ptinoides*, Marsh., occurs on ivy on the trees. The bark of the larger trees sometimes harbours *Dromius 4-notatus*, Panz., and *D. agilis*, F., *Epuraea thoracica*, Four., and *E. florea*, Er., and many good species. Both *Orsodacne cerasi*, L., and *O. lineola*, Panz., have been taken on the Common in former years. *Hylastinus obscurus*, Mar., occurs on the vegetation near gorse bushes.

Sweeping generally over the Common, at the woodsides and in the vicinity of the ponds gives abundant indication of the large number of species obtainable if the locality is suitably worked. I swept *Apion genistae*, Kirby, on one occasion in 1929 but others and myself have been unsuccessful since. The genus *Apion* is represented by 29 species so far noticed, including *A. ebeninum*, Kirby, *A. affine*, Kirby, and *A. viciae*, Payk. I have not yet had the pleasure of taking *Chrysolina varians*, Schall., and *C. goettingensis*, L., on the Common, but it has fallen to my lot to take a black specimen of *Lema puncticollis*, Curt. *Lema lichenis*, Voet, is common and both species of *Sphaeroderma* occur on thistles. *Cassida flaveola*, Thnb., and *C. vibex*, L., are taken singly and odd examples of *Antherophagus nigricornis*, F., and *A. pallens*, F., are occasionally met with. *Gymnetron melanarium*, Germ., and *Phytobius canaliculatus*, Th., sometimes occur fairly numerously. The *Cantharis* species, *C. fulvicollis*, F., *C. bicolor*, Hb., and *C. pallida*, Gozis, are usually common, as was also *C. figurata*, Man. On one occasion *Phyllotreta* was well represented and *P. mantura*, *P. rustica*, L., and *P. obtusata*, Gyll., have been taken, the latter frequently. In fact a very large number of species are to be secured by this crude means alone. The method has one advantage, that unexpected species sometimes are revealed and their presence once detected the particular means to complete your series can then be pursued. I have, however, on my excursions developed searching low plants, particularly flowers, with good results.

Sifting general refuse and dead leaves evidences the presence of many species, for example, *Stilicus erichsoni*, Fauv., *Anthicus floralis*, L., *Sciodrepa watsoni*, Sp., and *Bythinus bulbifer*, Reich., *Badister bipustulatus*, F., has been found under clumps of earth, besides other species.

On the open common horse-dung patches are infrequent but *Ontho-*

phagus coenobita, Hb., *Hister 12-striatus*, Sch., *Philonthus cruentatus*, Gmel., and many other dung feeders are to be taken. Cow dung, however, is frequent and in drier weather conditions numerous species, as *Sphaeridium lunatum*, F., and *S. bipustulatum*, L., *Cercyon lugubris*, Ol., and *C. lateralis*, Marsh., *Aphodius erraticus*, L., and *A. pusillus*, Hb., *Aleochara intricata*, Mar., and many other species tenant the patches, more or less commonly.

Dead rabbits have shown the presence of *Oeceoptoma thoracicum*, L., *Necrobia violacea*, L., and *Nargus wilkini*, Spence. Carrion, however, is usually scarce; an occasional find of an old bone or bones has evidenced two species of *Omosita*, but the third, *O. depressa*, L., which has been recorded, I have not yet observed.

In the woods and the more moist spots very little fungus growth has been observed during the year, but *Bolitobius thoracicus*, F., and *Cis hispidus*, Payk., have been taken and *Oxyporus rufus*, L., has been swept. Few other fungus feeders have personally been noted.

In conclusion I must give my thanks to Mr S. R. Ashby for assistance given in connection with his captures in the locality, 59 of which I have not yet observed.

The three small boxes exhibited represent the species associated with the Common arranged more or less on the plan of the paper. The specimens selected have mainly been taken in the locality. The larger box contains the majority of the other species that occur on the Common.

LIST OF SPECIES.

Those indicated by an asterisk have not been taken personally.

Leistus fulvibarbis, Dej., *Nebria brevicollis*, F., *Notiophilus rufipes*, Curt., and *N. biguttatus*, F., *Elaphrus cupreus*, Dufts., and *E. riparius*, L., *Loricera pilicornis*, F., *Clivina fossor*, L., *Dyschirius aeneus*, Dej., *Asaphidion flavipes*, L., *Bembidion lampros*, Hbst. (with ssp. *properans*, Steph.), *B. dentellum*, Thunb., *B. varium*, Ol., *B. rupestre*, L., *B. transparens*, Geb., var. *clarki*, Daws., *B. quadripustulatum*, Serv., *B. doris*, Panz., *B. articulatum*, Panz., *B. biguttatum*, F., *B. unicolor*, Chaud., *B. guttula*, F.,* and *B. lunulatum*, Fourc., *Badister bipustulatus*, F., and *B. sodalis*, Dufts., *Ophonus punctatulus*, Dufts.,* *Stenolophus teutonius*, Schr., and *S. mixtus*, Hbst. (with var. *ziegleri*, Panz.), *Acupalpus flavicollis*, Stm., *A. meridianus*, L., *A. dorsalis*, F., *A. luridus*, Dej., and *A. consputus*, Dufts., *Bradycellus ruficollis*, Steph., *Anisodactylus binotatus*, F., *Stomis pumicatus*, Panz., *Feronia caerulelescens*, L., *F. vernalis*, Panz., *F. macra*, Marsh., *F. nigrita*, F., *F. minor*, Gyll., *F. strenua*, Panz., *F. diligens*, Stm., and *F. madida*, F., *Abarx parallelopipedus*, Pill. & Mitt., *Agonum marginatum*, L., *A. mülleri*, Hbst., *A. viduum*, Panz. (with vars. *moestum*, Dufts., and *emarginatum*, Gyll.), *A. livens*, Gyll., *A. ruficorne*, Goez., *A. obscurum*, Hbst., *A. scitulum*, Dej.,* *A. fuliginosum*, Panz., *A. piceum*, L., and *A. gracile*, Gyll., *Lebia cyanocephala*, L.,* *Risophilus atricapillus*, L.,

Dromius linearis, Ol., *D. agilis*, F., *D. quadrimaculatus*, L., *D. quadrinotatus*, Panz., *D. quadrisignatus*, Dej., and *D. melanocephalus*, Dej., *Metabletus obscuroguttatus*, Duft.

Haliphus confinis, Steph.,* *H. obliquus*, F.,* *H. lineatocollis*, Marsh., *H. ruficollis*, Deg., *H. heydeni*, Wehn., *H. immaculatus*, Gerh., *H. wehnckeii*, Gerh., *H. fulvus*, F., and *H. flavicollis*, Stm., *Hygrobia hermanni*, F., *Noterus capricornis*, Hbst., *Laccophilus minutus*, L.,* *Hyphydrus ovatus*, L., *Hygrotus inaequalis*, F., and *H. impressopunctatus*, Sch., *Hydroporus pictus*, F., *H. lineatus*, F., *H. angustatus*, Stm., *H. palustris*, L., *H. erythrocephalus*, L., *H. memnonius*, Nic., *H. pubescens*, Gyll., *H. planus*, F., and *H. tessellatus*, Drap., *Agabus didymus*, Ol., *A. sturmii*, Gyll., *A. chalconatus*, Panz., and *A. bipustulatus*, L., *Ilybius fuliginosus*, F., *I. ater*, Deg., and *I. obscurus*, Marsh., *Copelatus agilis*, F., *Rantus exoletus*, Fors., and *R. bistriatus*, Berg., *Colymbetes fuscus*, L., *Hydaticus seminiger*, Deg., *Gyrinus nator*, L., var. *substriatus*, Steph.

Hydrobius fuscipes, L., *Enochrus melanocephalus*, Ol., *Philydrus testaceus*, F., and *P. coarctatus*, Gredl., *Cymbiodyta marginella*, F., *Anacaena globulus*, Payk., and *A. limbata*, F., *Helochares lividus*, F.,* and *H. punctatus*, Shp., *Laccobius sinuatus*, Mots.,* *L. bipunctatus*, F., and *L. biguttatus*, Gerh., *Chaetarthria seminulum*, Hbst.,* *Megalelophorus aquaticus*, L., and *M. aequalis*, Thm., *Helophorus aeneipennis*, Thm., *H. affinis*, Marsh., *H. minutus*, F., and *H. granularis*, L., *Atractelophorus brevipalpis*, Bed., *Hydrochus angustatus*, Germ., *Ochthebius impressus*, Marsh., *Hydraena riparia*, Kug., *Coelostoma orbiculare*, F., *Sphaeridium lunatum*, F., *S. scarabaeoides*, L., and *S. bipustulatum*, F., *Cercyon ustulatus*, Preys., *C. impressus*, Steph., *C. lugubris*, Ol., *C. marinus*, Thms., *C. haemorrhoidalis*, F., *C. lateralis*, Marsh., *C. melanocephalus*, L., *C. analis*, Payk., *C. lugubris*, Payk., and *C. granarius*, Er., *Megasternum boletophagum*, Marsh.

Aleochara curtula, Goez.,* *A. lata*, Grav., *A. tristis*, Grav., *A. intricata*, Marsh., *A. lanuginosa*, Grav., and *A. bipustulata*, L., *Oxytoma lividipennis*, Mann., *O. opaca*, Grav., and *O. haemorrhoea*, Mann., *Ischnoglossa prolixa*, Grav., *Cousya maura*, Er., *Phloeopora testacea*, Mann., *Ocalia picata*, Steph., *Metaxya gyllenhali*, Thm., and *M. hygrotopora*, Kr., *Dinaraea aequata*, Er., *Plataraea brunnea*, F.,* *Microdota mortuorum*, Thm., and *M. amicula*, Steph., *Atheta pilicornis*, Thm., *Acrotona fungi*, Grav., *A. clientula*, Er., and *A. laticollis*, Steph.,* *Amidobia validiuscula*, Kr., *Amischa analis*, Grav., *Sipalia circellaris*, Grav., *Gnypeta carbonaria*, Mann., *Thectura cuspidata*, Er., *Encephalus complicans*, Westw., *Gyrophæna affinis*, Mann., and *G. strictula*, Er., *Placusa denticulata*, Shp., *Myllaena dubia*, Grav., *Gymnusa brevicollis*, Payk., *Hypocyptus longicornis*, Payk., *Tachyporus solutus*, Er.,* *T. chrysomeloides*, L.,* *T. hypnorum*, F., *T. macropterus*, Steph., *T. pusillus*, Grav., and *T. nitidulus*, F., *Tachinus humeralis*, Grav., and *T. rufipes*, Deg., *Bryocharis cingulata*, Mann., *Bolitobius exoletus*, Er., and *B. thoracicus*, F., *Mycetoporus splendens*, Marsh., and *M. splen-*

didus, Grav., *Quedius mesomelinus*, Marsh., *Q. fuliginosus*, Grav., *Q. nigriceps*, Kr., *Q. maurorufus*, Grav., *Q. rufipes*, Grav.,* and *Q. semi-aeneus*, Steph.,* *Philonthus splendens*, F., *P. fuscipennis*, Mann., *P. varius*, Gyll., *P. sordidus*, Grav., *P. cruentatus*, Gmel., *P. varians*, Payk., *P. quisquiliarius*, Gyll. (with var. *inquinatus*, Steph.), *P. fumarius*, Grav., and *P. micans*, Grav., *Gabrius nigrutilus*, Grav., and *G. pennatus*, Shp., *Actobius cinerascens*, Grav., *Neobisnius procerulus*, Grav., *Xantholinus linearis*, Ol., and *X. longiventris*, Heer, *Baptolinus affinis*, Payk., *Othius punctulatus*, Goez., and *O. laeviusculus*, Steph.,* *Lathrobium elongatum*, L. (with var. *fraudulentum*, Gang.), *L. fulvipenne*, Grav., *L. brunnipes*, F., *L. longulum*, Grav., *L. quadratum*, Payk., *L. terminatum*, Grav., and *L. multipunctatum*, Grav., *Stilicis rufipes*, Germ., and *S. erichsoni*, Fauv., *Medon piceus*, Kr.,* and *M. propinquus*, Bris., *Astenus angustatus*, Payk., *Paederus litoralis*, Grav., *P. riparius*, L., and *P. fuscipes*, Curt., *Stenus bipunctatus*, Er., *S. bimaculatus*, Gmel., *S. juna*, F., *S. clavicornis*, Scop., *S. rogeri*, Kr., *S. bupthalmus*, Grav., *S. incrassatus*, Er., *S. canaliculatus*, Gyll., *S. nitens*, Steph., *S. pusillus*, Steph.,* *S. exiguus*, Er.,* *S. nanus*, Steph.,* *S. carbonarius*, Gyll., *S. ossium*, Steph., *S. impressus*, Germ., *S. flavipes*, Steph., *S. pubescens*, Steph., *S. binotatus*, Ljun., *S. canescens*, Rosh., *S. pallitarsis*, Steph., *S. bifoveolatus*, Gyll., *S. picipennis*, Er.,* *S. picipes*, Steph.,* *S. cicindeloides*, Grav., *S. solutus*, Er., *S. tarsalis*, Ljun., *S. fulvicornis*, Steph., *S. latifrons*, Er., and *S. fornicatus*, Steph., *Oxyporus rufus*, L., *Bledius fracticornis*, Payk., *Platystethus arenarius*, Four., *P. cornutus*, Grav., *P. alutaceus*, Thm., and *P. capito*, Heer, *Oxytelus rugosus*, F., *O. laqueatus*, Marsh., *O. inustus*, Grav., *O. sculpturatus*, Grav., *O. nitidulus*, Grav., *O. complanatus*, Er., and *O. tetracarinatus*, Block., *Trogophloeus bilineatus*, Steph., *T. rivularis*, Mots., *T. elongatulus*, Er., and *T. corticinus*, Grav., *Aerognathus mandibularis*, Gyll., *Lesteva longelytrata*, Goez., and *L. heeri*, Fauv., *Lathrimaeum atrocephalum*, Gyll., *Philorinum sordidum*, Steph., *Omalium rivulare*, Payk., *Phloeconomus pusillus*, Grav., *Phloeostiba planum*, Payk., *Anthobium minutum*, F., and *A. ophthalmicum*, Payk., *Megarthus depressus*, Payk.

Liodes calcarata, Er.,* *Necrophorus vespillo*, L.,* *Thanatophilus rugosus*, L., and *T. sinuatus*, F.,* *Oeceoptoma thoracicum*, L., *Nargus wilkini*, Spence, *Catops nigrita*, Er.,* *Sciodrepa watsoni*, Spence, *Stenichnus collaris*, Müll., *Bythinus bulbifer*, Reich., *Bryaxis sanguinea*, Rb. (with ab. *nigripennis*, Fowl.), *Brachygluta fossulata*, Rb., *Reichenbachia juncorum*, Le., *Euplectus piceus*, Mots., *Ptinella tenella*, Er.

Trichopteryx fasciculare, Hbst., *T. intermedia*, Gyll., *T. longula*, Matt., and *T. sericans*, Heer, *Phalacrus coruscus*, Panz., *Stilbia testacea*, Panz., *Anisosticta 19-punctata*, L., *Adalia bipunctata*, L., and *A. 10-punctata*, L., *Coccinella 11-punctata*, L., and *C. 7-punctata* L., *Propylaea 14-punctata*, L., *Micraspis 14-punctata*, L., *Calvia 14-guttata*, L., *Seymnus capitatus*, F., *S. rubromaculatus*, Goez., and *S. redtenbacheri*, Mulst.,* *Chilocorus renipustulatus*, Scriba., *Exochomus 4-*

pustulatus, L., *Rhizobius litura*, F., *Coccidula rufa*, Hbst., *Cerylon histeroideus*, F., and *C. fagi*, Bris., *Hister 12-striatus*, Schr., *Saprinus semistriatus*, Scrba.,* and *S. virescens*, Payk.,* *Brachypterus glaber*, Steph., and *B. urticae*, F., *Cateretes pedicularius*, L., and *C. rufilabris*, Latr., *Epuraea melina*, Steph.,* *E. thoracica*, Tourn., *E. florea*, Er., *E. deleta*, Steph., and *E. unicolor*, Ol., *Nitidula bipunctata*, L., and *N. rufipes*, L.,* *Omosita depressa*, L.,* *O. colon*, L., and *O. discoidea*, F., *Pria dulcamarae*, Scop., *Meligethes atratus*, Ol., *M. lumbaris*, Steph.,* *M. aeneus*, F.,* *M. viridescens*, F., *M. brunnicornis*, Stm., *M. lugubris*, Stm., *M. obscurus*, Er.,* and *M. erythropus*, Gyll., *Cychramus luteus*, F., *Rhizophagus bipustulatus*, F., *Enicmus transversus*, Ol., *Corticaria crenulata*, Gyll., *Corticarina gibbosa*, Hbst., and *C. fuscula*, Gyll., *Silvanus unidentatus*, F., *Byturus tomentosus*, F., *Telmatophilus caricis*, Ol., *Antherophagus nigricornis*, F.,* and *A. pallens*, F., *Cryptophagus dentatus*, Hbst.,* *Atomaria fuscata*, Schr., *A. atra*, Hbst., *A. atricapilla*, Steph., *A. mesomelaena*, Hbst., and *A. analis*, Er., *Ootyphus globosus*, Walt.,* *Ephistemus globulus*, Payk., *Scaphidium quadrimaculatum*, Ol., *Dermestes murinus*, L., *Attagenus pellio*, L.,* *Ctesias serra*, F., *Anthrenus fuscus*, Ol., *Cytilus sericeus*, Forst., *Dryops auriculatus*, Geoff., and *D. luridus*, Er., *Heterocerus marginatus*, F., and *H. fenestratus*, Thnb.

Onthophagus coenobita, Hbst.,* *Aphodius erraticus*, L., *A. fossor*, L., *A. haemorrhoidalis*, L., *A. fimetarius*, L., *A. ater*, Deg., *A. granarius*, L., *A. pusillus*, Hbst., *A. sticticus*, Panz., *A. punctato-sulcatus*, Stm., and *A. contaminatus*, Hbst.

Agrilus laticornis, Ill., and *A. angustulus*, Ill., *Throscus dermes-toides*, L., *Melanotus rufipes*, Hbst., *Athous villosus*, Four., *A. haemorrhoidalis*, F., and *A. vittatus*, F.,* *Agriotes lineatus*, L., *A. acuminatus*, Steph., and *A. pallidulus*, Ill., *Dolopius marginatus*, L., *Prosternon holosericeus*, Ol.

Helodes minuta, L., *Microcara testacea*, L., *Cyphon variabilis*, Thnb., *C. paykulli*, Guen., and *C. ochraceus*, Steph., *Scirtes hemispherica*, L.,* *Lampyris noctiluca*, L.,* *Cantharis rustica*, Falln., *C. pellucida*, F., *C. figurata*, Mann., *C. pallida*, Gozis., *C. fulvicollis*, F., and *C. bicolor*, Hbst., *Metacantharis haemorrhoidalis*, Thnb., *Rhagonycha limbata*, Thm., and *R. lignosa*, Müll., *Malthinus flaveolus*, Payk., *M. fasciatus*, Fall., and *M. frontalis*, Marsh., *Malthodes marginatus*, Latr., and *M. minimus*, L., *Malachius bipustulatus*, L., *Anthocomus fasciatus*, L.,* *Dasytes aerosus*, Kies., *Phloeophilus edwardsi*, Steph.,* *Necrobia violacea*, L.*

Hedobia imperialis, L.,* *Dryophilus pusillus*, Gyll., *Anobium fulvicorne*, Stm., *Ptilinus pectinicornis*, L., *Ochina ptinoides*, Marsh., *Cis boleti*, Scop.,* *C. hispidus*, Payk., and *C. bilamellatus*, Fowl.*

Asemum striatum, L.,* *Poecilium alni*, L.,* *Molorchus minor*, L.,* and *M. umbellatum*, Schr.,* *Alosterna tabacicolor*, Deg., *Grammoptera ruficornis*, L., *Leiopus nebulosus*, L., *Pogonochaerus hispidulus*, Pill.,* and *P. hispidus*, Sch., *Saperda populnea*, L.,* *Tetrops praeusta*, L.

Bruchidius cisti, Payk., *Laria atomaria*, L.,* *L. rufipes*, Hbst.,* and *L. loti*, Payk., *Orsodacne cerasi*, L.,* and *O. lineola*, Panz.,* *Donacia thalassina*, Germ.,* *D. simplex*, F., and *D. vulgaris*, Zsch., *Lema puncticollis*, Curt., and *L. lichenis*, Voet, *Cryptocephalus fulvus*, Gozis, and *C. labiatus*, L., *Chrysolina polita*, L., *C. varians*, Schil.,* and *C. goettingensis*, L.,* *Phytodecta viminalis*, L., and *P. olivacea*, Forst., *Gastroidea polygoni*, L., *Phaedon armoraciae*, L., and *P. cochleariae*, F., *Phyllodecta laticollis*, Suffr., and *P. vitellinae*, L., *Hydrothassa aucta*, F., *Prasocuris junci*, Brahm, and *P. phellandrii*, L., *Lochmaea capreae*, L., and *L. crataegi*, Forst., *Galerucella grisescens*, Joan, *G. lineola*, F., and *G. tenella*, L., *Longitarsus holsaticus*, L., *L. luridus*, Scop., *L. senecionis*, Bris., *L. atricillus*, L., *L. jacobaeae*, Wat., and *L. succineus*, Foudr.,* *Haltica palustris*, Wse., *Phyllotreta nodicornis*, Marsh.,* *P. nigripes*, F., *P. consobrina*, Curt., *P. diademata*, Foudr., *P. atra*, F., *P. vittula*, Redt., *P. undulata*, Kuts., *P. nemorum*, L.,* and *P. exclamationis*, Thnb., *Aphthona lutescens*, Gyll., and *A. cyanella*, Redt., *Batophila rubi*, Payk., *Sphaeroderma rubidum*, Graef., and *S. testaceum*, F., *Apteropeda orbiculata*, Marsh., *Mantura rustica*, L.,* and *M. obtusata*, Gyll., *Lythrraria salicariae*, Payk., *Ochrosis ventralis*, Ill., *Crepidodera transversa*, Marsh., *Chalcoides aurea*, Geof., *C. aurata*, Marsh., and *C. fulvicornis*, F., *Hippuriphila modeeri*, L., *Chaetocnema concinna*, Marsh., *confusa*, Boh.,* and *C. hortensis*, Geof., *Psylliodes affinis*, Payk., *P. napi*, F.,* and *P. chalcomera*, Ill., *Cassida vibex*, L., *C. flaveola*, Thnb., and *C. rubiginosa*, Müll.

Lagria hirta, L.,* *Orchesia undulata*, Kr.,* *Conopalpus testaceus*, Ol.,* *Abdera biflexuosa*, Curt., *Oedemera lurida*, Marsh., *Mordellistena pumila*, Gyll., *Anaspis frontalis*, L., *A. humeralis*, F., *A. regimbarti*, Schils.,* *A. subtestacea*, Steph., and *A. maculata*, Fourc., *Anthicus floralis*, L.

Rhynchites aequatus, L. (with ab. *paykulli*, Schil.), *R. acneovirens*, Marsh. (with ab. *fragariae*, Deg.), *R. germanicus*, Hbst., *R. interpunctatus*, Steph., *R. pauxillus*, Germ.,* *R. nanus*, Payk., *R. tomentosus*, Gyll., *R. longiceps*, Thm., *R. mannerheimi*, Humm.,* and *R. betulae*, L., *Apion ulicis*, Forst., *A. genistae*, Kirb., *A. fuscirostre*, F., *A. minutum*, Germ., *A. viciae*, Payk., *A. dissimile*, Germ., *A. ononicola*, Bach,* *A. assimile*, Kirb.,* *A. flavipes*, Payk., *A. confluens*, Kirb.,* *A. hookeri*, Kirb., *A. onopordi*, Kirb., *A. virens*, Hbst., *A. punctigerum*, Payk., *A. ebeninum*, Kirb., *A. spencei*, Kirb., *A. ervi*, Kirb., *A. platalea*, Germ., *A. scutellare*, Kirb., *A. loti*, Kirb., *A. seniculum*, Kirb.,* *A. tenue*, Kirb.,* *A. simile*, Kirb., *A. pubescens*, Kirb.,* *A. marchicum*, Hbst.,* *A. affine*, Kirb., *A. hydrolapathi*, Marsh. and *A. curtirostre*, Germ., *Otiorynchus singularis*, L., *Strophosomus melanogrammus*, Forst. and *S. capitatus*, Deg., *Barypithes araneiformis*, Schr., *Polydrosus flavipes*, Deg., *Phyllobius oblongus*, L., *P. urticae*, Deg., *P. pyri*, L., *P. argentatus*, L. and *P. parvulus*, Ol., *Barynotus obscurus*, F., *Sitona cambriacus*, Steph., *S. regensteinensis*, Hbst., *S. tibialis*, Hbst., *S. hispidulus*, F., *S. suturalis*, Steph. and *S. lineatus*, L., *Phytonomus rumicis*, L.,

P. adspersus, F. (with var. *alternans*, Steph.), *P. murinus*, F., *P. venustus*, F., and *P. nigrirostris*, F., *Liosoma deflexum*, Panz., and *L. oblongulum*, Boh., *Orchestes quercus*, L., *O. pilosus*, F. (with var. *nigripes*, Fowl.), *O. avellanae*, Don., *O. fagi*, L., *O. stigma*, Germ. and *O. salicis*, L., *Rhamphus pulicarius*, Hbst.,* *Notaris scirpi*, F. and *N. acridulus*, L., *Erirrhinus festucae*, Hbst., *E. nereis*, Payk., and *E. scirrhosus*, Gyll., *Dorytomus maculatus*, Marsh. (with var. *costirostris*, Gyll.), *D. melanophthalmus*, Wenck. (with var. *agnathus*, Boh.) and *D. rufulus*, Bed.,* *Tanysphyrus lemnae*, F., *Hydronomus alismatis*, Marsh.,* *Bagous limosus*, Gyll., *B. lutulosus*, Gyll., *B. tempestivus*, Hbst., *B. lutulentus*, Gyll. and *B. glabrirostris*, Hbst., *Anoplus plantaris*, Naev., *Microtrogus picrostris*, F., *Sibinia potentillae*, Germ., *Gymnetron beccabungae*, L., *G. veronicae*, Germ. (var. *nigrum*, Wa.), *G. melanarium*, Germ. and *G. pascuorum*, Gyll., *Anthonomus inversus*, Bed.,* *A. pedicularius*, L., *A. chevrolati*, Desbr.,* *A. pubescens*, Payk.* and *A. rubi*, Hbst., *Nanophyes gracilis*, Redt., *Cionus hortulanus*, Fourc., *C. alauda*, Hbst., and *C. pulchellus*, Hbst., *Coeliodes rubicundus*, Hbst.,* *C. dryados*, Gmel., *C. ruber*, Marsh., and *C. erythroleucus*, Gmel.,* *Stenocaris fuliginosus*, Marsh., *Cidnorrhinus quadrimaculatus*, L., *Poophagus sisymbrii*, F., *Ceuthorhynchus assimilis*, Payk., *C. cochleariae*, Gyll., *C. erysimi*, F., *C. contractus*, Marsh., *C. quadridens*, Panz., *C. pollinarius*, Forst., *C. pleurostigma*, Marsh.,* *C. resedae*, Marsh.,* *C. melanostictus*, Marsh., *C. asperifoliarum*, Gyll., *C. floralis*, Payk., *C. melanarius*, Steph., and *C. nasturtii*, Germ., *Ceuthorhynchidius troglodytes*, F., *Rhinoneus pericarpus*, L., and *R. castor*, F., *Phytobius waltoni*, Boh.,* and *P. canaliculatus*, Fahr., *Balaninus venosus*, Grav., *B. nuzum*, L., *B. glandium*, Marsh.,* and *B. villosus*, F., *Balanobius salicivorus*, Payk., and *B. pyrrhocerus*, Marsh., *Magdalis cerasi*, L., *M. ruficornis*, L., and *M. barbicornis*, Latr.,* *Eccoptogaster scolytus*, F., *E. mali*, Beck,* and *E. rugulosus*, Ratz.,* *Hylastinus obscurus*, Marsh., *Hylesinus crenatus*, F., and *H. fraxini*, Panz.,* *Dryocaetes villosus*, F., *Xyleborus dispar*, F.*

WING MARKINGS IN DIPTERA.

By H. W. ANDREWS, F.R.E.S.

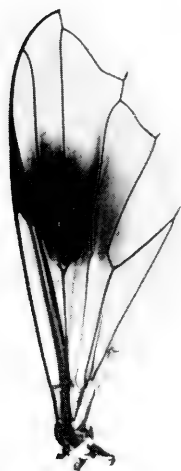
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Plts. X, XI.

There are four Orders of Insects whose imagines may be characterized as aerial, viz.:—Diptera, Neuroptera, Hymenoptera, and Lepidoptera, but only the last named has developed wing markings to any considerable extent. In the others wing markings are the exception rather than the rule and when present are not of the same kind as those of Lepidoptera, being caused by chemico-physical action colouring the wing membrane instead of by an external development of scales. Exceptions occur, e.g., the *Scsuidae* (Clear-wings) in Lepidoptera and *Psychodidae* (Owl-flies) and certain families of Mosquitoes in Diptera, but they are comparatively few in number, and wing scales, when they do occur, are more loosely attached in Diptera than in Lepidoptera and liable to be rubbed off more easily. Another point of difference between the Lepidoptera and the clear-winged Orders is that the former have a much greater wing area and predominance of pattern thereon compared with body area, whereas in the latter the wing area compared with body area is very much smaller, and such patterns as may exist occur on the body rather than on the wings.

The Diptera are essentially one of the clear-winged Orders, the typical dipterous wing consisting of two layers of transparent membrane which are of vitreous appearance and devoid of special markings apart from iridescence caused by structural modifications of the surface. At first sight, therefore, the title of this paper, "Wing Markings in Diptera," might seem to be a misnomer, yet, when looked for, it is surprising to find the number of families containing species with wing markings of one kind or another, though—again in contrast to the Lepidoptera—it by no means follows that any particular type of markings is common to all or even to a majority of the species comprised in any given family. Perhaps in consequence of this, and the paucity of wing markings in the Order as a whole, but little use is made of wing patterns for classification purposes save in a few exceptional families such as *Ortalidae* and *Trypetidae* where almost all the species have their wings patterned; and the subject of wing markings in general has received very little attention in text-books on this Order.

Such markings as do exist tend to fall into three main groups and may consist (A) of bands, streaks, and spots, on an otherwise clear surface; (B) of cases where the whole or part of the wing is tinted; or (C) of cases where the whole wing surface is mottled, latticed, or reticulated, faintly or strongly, with or without other markings superim-



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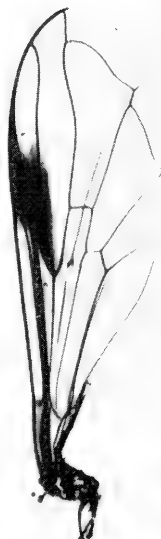
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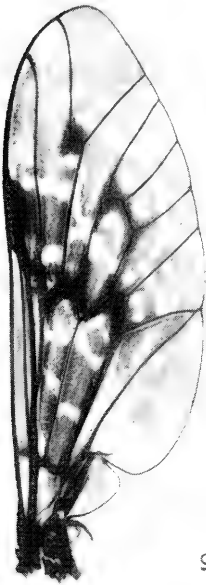
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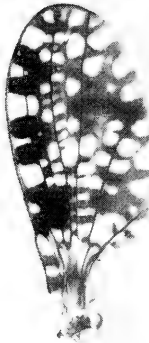
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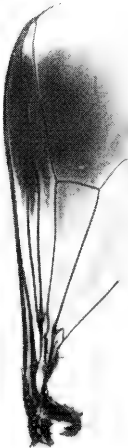
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EXPLANATION OF PLATES X, XI.

- Group A. 1. Wing of a Leptid fly showing stigma in an otherwise clear wing.
2. Wing of a Leptid fly showing stigmatic area faintly extended downwards and darkened cross-veins.
3. Wing of a Syrphid fly showing costal streak and slight downward extension of stigmatic area.
4. Wing of a Syrphid fly showing stigmatic area extending downwards and forming a median band or blotch.
5. Wing of an Ortalid fly showing strong wing bands.
6. Wing of a Lonchaeid fly showing apical blotch and spotted and banded cross-veins.
7. Wing of a Conopid fly showing deepened costal streak.
- Group B. 8. Wing of a Dolichopid fly showing darkened apical portion and white tip (an opaque white which hardly shows in the photograph).
9. Wing of an Asilid fly showing darkened basal portion of wing.
- Group C. 10. Wing of a Tabanid fly with mottled surface markings (somewhat darkened median band and cross-veins superimposed).
11. Wing of a Sciomyzid fly with reticulated surface markings and darkened costal streak extending around apex superimposed, faintly darkened cross-veins.
12. Wing of a Sciomyzid fly with latticed surface markings.
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NOTE ON PLATES.

In the first place, I have to thank my friends, Dr N. B. Blood, who made the slides, and Mr J. E. Andrews, who made such excellent photographs from them. Secondly, as they are all illustrating a "general" paper, I have not given detailed explanations (specific names, magnifications, etc.); and, thirdly, in some cases, e.g., figs. 3, 8, and 9, the photographs of a single wing do not show the general effect of the markings as well as can be seen when looking at a series of actual specimens.—H. W. ANDREWS.



posed. These groups appear to me to be fairly distinct though a small amount of overlapping occurs.

In the first group (A): bands, streaks, etc., I think there is some correlation between such markings and the structure of the wing. They originate in, and are mainly confined to, the stronger, i.e., fore marginal, portion of the wing, termed by Snodgrass the remigium (oar), that meets the resistance of the air in the action of flight, and in which the veins are stronger and more closely approximate than in the vannium (fan) forming the hind marginal portion. The cross veins, too, which presumably add to the strength of the wing by acting as braces to the longitudinal veins, are frequently clouded or spotted, sometimes in cases where the remainder of the wing is clear; and when spots occur they are nearly always found to be on one or other of the wing veins in the fore marginal part of the wing and but rarely on the hind marginal veins or the intervenous membrane.

In this first group the portion of the wing most generally marked is the "stigma" or "stigmatic area." This is a darkened or tinted area situated on the costal margin from half to two-thirds of the way between the base and tip of the wing. It frequently appears when no other marking is present and it is also to be found in other clear-winged Orders, e.g., Hymenoptera and Neuroptera. The stigma of Dragonflies has been defined by Needham as "a limited area on the costal margin of the wing, between the middle and the apex, which is more dense and usually darker than the other parts . . . and is developed upon the cutting edge of the wing at the point of greatest impact upon the air." Margan in "Le Vol des Insectes" refers to the stigma in the same Order as containing a sticky liquid. It seems doubtful if the stigma in the dipterous wing is of quite the same nature as that of dragon-flies but a darkening, or at least tinting, in this area is the most consistently prevalent of all wing markings in Diptera. This darkened stigmatic area is often prolonged downwards and forms a continuous or broken "median band" which as a rule becomes gradually fainter or fades out altogether before reaching the hind margin of the wing.

In a few species this dark "median band" on the wings, in conjunction with a clear or light coloured band on the body at the base of the abdomen, has the effect of breaking up the outline of the insect when it is in a resting position. This is well shown in the common Syrphid fly, *Volucella pellucens*, L., where the wings in their normal resting position are only semi-closed and their dark median bands come into line with the dark hinder portion of the abdomen. This leaves a light area caused by the clear basal abdominal band between two dark ones, the smaller formed by the head-cum-thorax of the insect, and another considerably larger and wider formed by the dark apical portion of the abdomen merging into and prolonged sideways by the dark median wing bands. This arrangement may be of cryptic value to the insect but I am doubtful of it. I am not aware that *V. pellucens*—at any rate in this country—is specially liable to attack by other insect

predators or by birds. I can find only one instance quoted in the publications of Dr Hobby and others on predaceous insects, and, moreover, other Diptera that have a similar more or less complete light band at the base of the abdomen have their wings quite devoid of markings.

There are other possible "mimicry" associations with wing markings. It has been suggested that the dark tinted wings of certain predaceous Asilids, e.g., *Dioctria oelandica*, L., are in mimetic relation with the equally darkened wings of the Ichneumon flies on which they often prey; and that the dull yellow-tinged wings of *Asilus crabroniformis* help to conceal the bright yellow abdomen of this "robber-fly" and are of cryptic value to the insect when lying in wait for possible victims on a patch of cow dung—one of its favourite haunts. Douglas Melin has gone into these questions at some length in his exhaustive monograph on "The Swedish Asilids" and refutes the idea that mimicry comes into play at all. Another case that comes to mind is that of the Tachinid fly, *Allophora hemiptera*, F., in which, as the specific name implies, the colouration of the wings, aided by the widened and flattened shape of the body, suggests a Hemipteron. Then there is the hymenopterous aspect of certain *Conopidae* with their dark costal wing streaks and pedunculate abdomens; and, finally, though scarcely coming within the scope of this paper, there is the well-known resemblance between certain *Eristalis* flies and bees. How these and similar resemblances are to be explained I do not know, but, with regard to mimicry in one or other of its phases being a satisfactory explanation, I am of opinion that until much more conclusive evidence has been accumulated the verdict must be the Scottish one of "not proven."

To return to wing markings there is, in addition to the stigma and median band, a third very prevalent marking in the shape of a dark longitudinal streak along the costal margin. This may be continuous to the apex, or, as in certain Tipulids, broken up with clear intervening spaces, or again may fade away as it approaches the wing tip. This longitudinal streak is usually confined closely to the costal margin and does not expand downwards, but in some species (e.g., certain *Bombyliidae*) it is considerably widened and deepened. I am inclined to think that such widening is due to what I term "tinted" rather than "structural" marking. Dark streaks may also occur along the course of other veins, especially the apical ends of the radial and median in the fore margin of the wing, and more rarely along the cubital vein in the hind margin. The cross-veins, too, especially those generally known as the inner and outer cross-veins, between the radial and median, and the median and cubital veins, are liable to be darkened or clouded, and so are the forkings of veins.

Another form of wing marking often found in otherwise clear winged species in the Calypterate groups of *Anthomyidae* and *Tachinidae* is a darkened or tinted area at the base of the wings which may extend for some distance along the basal portion of the costal margin. A good

example of this type of marking is shown by the common species, *Mesembrina meridiana*, L., where the yellow tinted area at the base of the wings contrasts sharply with the shining blue-black body colour. I think this marking, too, is structural in origin as the veins here are naturally both stronger and more closely approximated than at any other portion of the wing.

Spots, when they occur, are usually strung along the course of one or other of the wing veins, and often occur in conjunction with other markings. There are also a number of species with dark markings at the apex of the wing, either in the form of an isolated spot, well exemplified in species of the Acalypterate genus *Sepsis*, or existing as a dark terminal blotch which I have termed the "apical band" in connection with *Trypetidae*. I think this has been formed by the fusion of separate spots at the termination of the veins in that area and, if so, this would bring it under the "structural" formation of the first group of wing markings; it may, however, be one of the forms of my second group.

In this second (B) group the wings are tinted or darkened either wholly or in part. Here there does not seem to be any connection with stronger or weaker portions of the wing or with the veins as in group (A). This tinting may be faint or strong, may extend over the whole surface of the wing or stay confined to certain areas, but where it occurs it is evenly spread and of equal intensity of colour throughout, not fading out as in the case of the "median band" for example. Tinting also occurs now and again as a wing marking difference in sex. In some species of this group the apical portion of the wing is darkened and the basal portion is clear, whilst in others the reverse is the case. This type of colouration occurs in all the sub-Orders of Diptera to a greater or less extent.

In the third group (C) the wings are mottled or reticulated all over, with or without other markings super-imposed. This type of markings occurs in most of the sub-Orders but is absent or only of rare occurrence in the more aerial, and also in some of the more highly developed families (e.g., in *Syrphidae* and in *Anthomyidae* and *Tachinidae*). It is, however, extremely prevalent in the large group of *Acalypteratae*. As in the second tinted-winged group, it appears to have no special connection with wing structure.

Sexual differences as shown in wing markings are rare. They occur here and there in various families, e.g., in *Nematocera* where *Bibio marci*, L., and *Dilophus febrilis*, L., have clear wings in the male and black ones in the female sex, and *Tipula fulvipennis*, Deg., which has grey male and brown female wings. Some species of *Beris* (*Stratiomyidae*) have the wings in the male darker than in the female. In the genus *Chrysops* (*Tabanidae*) the dark markings on the male wings are more extensive and diffused than the restricted and clearly cut wing markings of the females. In *Trypetidae*, too, there is a slight sexual difference in the wing markings of one or two species. On the whole,

however, wing marking seem to be very little influenced by sex, and, indeed, in some of the cases cited above the difference is not easily apparent in a single pair but is observable when looking at a series.

Wing markings have no connection that I can find with biological habits such as bloodsucking, or the predaceousness of various groups of Diptera. As regards physical habits there are perhaps fewer cases of wing marking in those groups which are more aerial in their habits than in those termed terrestrial. This seems to be the case in both the main sub-Orders of Orthorrhapha and Cyclorrhapha, of which the former is considered by taxonomists to be less highly developed than the latter. It is possible, though I cannot bring forward any evidence on the point, that larval habits and pabulum may have some influence on the development of wing markings, but until we know far more than at present of the life-histories of many genera it is useless to speculate on this. In the mosquitoes, whose life-histories have been thoroughly investigated from every possible angle, I cannot recollect that anything of the sort has been suggested though, not being an economic entomologist, I may quite likely have overlooked some evidence bearing on this point.

To sum up the foregoing remarks it appears that the presence of wing markings is widespread throughout the Order, and that they are indiscriminate in their occurrence, though less obvious perhaps in those groups of more definitely aerial habits. There seem to be three main types of markings, and I have put forward the suggestion that one of them may be more closely correlated with the physical structure of the wings than the others, though I must frankly admit that this hypothesis does not account for the fact that only a minority of species possess wing markings whilst the great majority are clear winged. Sex does not appear to play any important part in wing marking, nor do such biological habits as bloodsucking, etc., whilst I consider that such suggestions of mimicry as have been raised in connection with wing markings still remain "not proven."

Finally, a word of warning. I have referred to British species throughout this paper, and as our 5000 odd species are only a fraction of the Palaearctic group, and a still smaller fraction of the Diptera as a whole, it is quite possible that a wider scope of investigation might alter or invalidate many of the conclusions I have drawn. However, I trust that what I have said may prove to have been of interest, to dipterists at any rate, and may draw some attention to one of the many biological aspects of our common hobby which await further investigation and research.

APPENDIX TO WING MARKINGS IN DIPTERA.

The Diptera are divided by taxonomists into two sub-Orders—DIPTERA ORTHORRHAPHA and DIPTERA CYCLORRHAPHA, which are differentiated by pupal characters. Of these two sub-Orders the former contains the

more primitive, and the latter the more advanced forms. The following summary of the families comprised in them based on Verrall's and Grimshaw's Lists is considered from a wing marking point of view.

Orthorrhapha nematocera—Twelve families consisting of *Cecidomyiidae*, *Mycetophilidae*, *Bibionidae*, *Chironomidae*, *Tipulidae*, etc. I have no first-hand knowledge of the Nematocera myself, but Mr Audcent has kindly given me information about their wing markings. Only a small proportion are absolutely clear winged and in some genera all the species have wing markings. My three groups are all represented and in addition it is only in the Nematocera that wing markings due to the presence of scales and hairs on the wings are to be found, e.g., *Psychodidae*, *Culicidae* and the genus *Culicoides* of the *Ceratopogonidae*. The majority of the families of Nematocera are aerial in habits.

Orthorrhapha brachycera—Eleven families consisting of *Stratiomyidae*, *Tabanidae*, *Leptidae*, *Asilidae*, *Bombyliidae*, etc., and the two large families of *Empidae* and *Dolichopodidae*. All three groups of wing markings are represented with (A) perhaps predominating in the first-named families, (B) especially in *Empidae* and (C) occurring but rarely. The families *Stratiomyidae* to *Asilidae* are terrestrial rather than aerial in habit, the *Bombyliidae* distinctly aerial, and the *Empidae* and *Dolichopodidae* are mixed, some genera being decidedly aerial and others equally terrestrial in their habits.

Cyclorrhapha aschiza—Five families only: *Syrphidae*, *Pipunculidae*, *Platypezidae*, *Phoridae* and *Braulidae*. Of these the *Syrphidae* have a number of species coming under group (A) and a smaller number under group (B), though in their case the tinting is seldom intense. Group (C) is not represented. The *Pipunculidae* are clear winged except for stigmatic markings in a fair number of species, and this is likewise the case in the *Platypezidae*. I know but little about *Phoridae* but I gather that a number of species have tinted wings and so come into my group (B). The last family, *Braulidae*, are wingless (Verrall places this family with *Hippoboscidae*). The *Syrphidae* and *Pipunculidae* are predominantly aerial in habits, *Platypezidae* mainly, and *Phoridae* almost entirely terrestrial.

Cyclorrhapha schizophora—These are divided into *Calypteratae* and *Acalypteratae*. The former comprised four families (Verrall) or two (Grimshaw) *Oestridae*, *Muscidae*, *Tachinidae* and *Anthomyiidae*, Grimshaw sinking *Oestridae* and *Anthomyiidae* into sub-families. The *Oestridae* have faint wing bands in some species. *Muscidae*, *Tachinidae* and *Anthomyiidae* have clear wings in the great majority of cases but clouded cross-veins occur now and again and there are frequent cases of a darkened or tinted area at the base of the wings. A certain number of species have darkened or tinted wings (group (B)), but in these cases the colour is seldom intense. The *Anthomyiidae* are more aerial in habits than the other families. The *Acalypteratae* comprise a larger number of families than any other group. Verrall gives 27, which Grimshaw expands

to 35. *Cordyluridae*, *Helomyzidae*, *Ortalidae*, *Trypetidae*, *Sepsidae*, *Agromyzidae*, *Phytomyzidae* are a few examples. Chiefly, I suppose, owing to this large number of families all three of my wing marking groups are well represented in *Acalypteratae* with (C) predominating. In some families, e.g., *Ortalidae* and *Trypetidae*, practically all the species have wing markings and clear wings are quite exceptional. All the families so far as I know are terrestrial in habit.

Lastly, there is that section of *Cyclorrhapha* known as *Pupipara*, where the adults are parasitic on warm-blooded animals, and which is often considered a separate sub-Order. These are two families, *Hippoboscidae*, which includes the well-known Forest-fly, and *Nycteribiidae*, whose species are parasitic on bats. In the former family wings may be present or absent and in the latter they are altogether wanting. As might be expected, both are terrestrial in habit, and wing markings, except for the strongly marked veins in the basal portion of the wings of some *Hippoboscidae*, are absent.

+CYTISUS ADAMI, POIT.

A CHIMAERA, OR SO-CALLED GRAFT HYBRID.

Contributed by T. R. EAGLES.

A flowering spray of this plant was exhibited by Mr S. F. Doudney in June 1941, and the following notes about it may be of interest.

It is a mixture, to use a neutral term, of the common laburnum (*Laburnum vulgare*, J. Presl.) and *Cytisus purpureus*, Scop., a kind of purple broom. In nature the broom would grow in a sprawling shrubby manner, and in order to make it more suitable for formal gardens a standard specimen was obtained by using laburnum as a stock and by grafting the broom on it, just as we get standard roses by grafting a choice rose on a briar. It was not an uncommon operation among gardeners and nurserymen. The result was a pleasing display of purple broom flowers mounted on a straight standard of laburnum. Any bottom shoots of laburnum would be removed, just as we remove briar shoots from our standard roses. But one grafting operation went wrong and produced *Cytisus adami*. This happened in 1825 in a nursery near Paris belonging to Jean Louis Adam. Never since has this happened again, either accidentally or as a result of any of the numerous deliberate attempts to repeat it. The tree cannot be obtained from seed. In short, every such tree is from a cutting and is derived from the original specimen. It is, indeed, part of the original tree.

I suppose it would strike the ordinary observer as a curiously coloured laburnum. It grows to be a small tree of the same appearance, the leaves are the same shape as laburnum leaves, and the sprays of flowers are likewise similar in shape. But the colour of the flowers is purplish brown.

Frequently parts revert to the two originals and so you may have three types of flower on one tree. In such cases the reversion may extend to a whole bough, giving very noticeable patches of broom-like growth which attract attention even in winter. Indeed, my first acquaintance with the plant came about one winter when I noticed in a neighbour's garden a tree which I took to be a laburnum bearing the familiar gall growths known as "Witch knots" or "Witches' broom." I made enquiries and was put right by a horticultural friend.

C. adami is listed by nurserymen and is fairly commonly grown. It is referred to by Darwin and is described in the "Natural History of Plants," Kerner and Oliver. In W. J. Bean's "Trees and Shrubs Hardy in the British Isles," it is described under the name *Laburnum adami*, Purple laburnum.

There has been a good deal of discussion about this plant and about other "chimaeras" or "graft hybrids" as they have been called. The choice between the two names is not a matter of indifference: a chimaera properly understood is one thing and a graft hybrid is quite

another. Indeed, some supporters of the chimaera hypothesis would say that a graft hybrid has never occurred.

The graft hybrid conception is quite simple. It is that cells of the two plants unite and so you get cells that are not of the same constitution as the cells of either originating plant. This would be similar to what might happen if a cross were obtained by fertilising flowers of laburnum with pollen of *C. purpureus* or vice versa. I say "might happen" because many attempts to produce a hybrid between the two by ordinary crossing of flowers have been made and all have failed. But to return to the graft, if the cells of the two originating plants had united to form a new type of cell, and if the plant had grown by division of these, then it would follow that all the cells in the plant would be of the same type. In 1891 Macfarlane, of Edinburgh, when making a microscopic examination of *C. adami*, noticed that the cells were not all the same. The outer cells were of the *C. purpureus* type, the inner ones were not.

This clue was not followed up, and it was a matter of 20 years before the chimaera idea was fully developed. Let us recall that the chimaera of classical days was not a hybrid of lion, goat, and dragon. That is to say, it was not an animal in which each part was a blend of the characters of the three animals named. It was worse than that. It was lion at the front, goat in the middle, and dragon behind, each section being distinct from the other and each section being true lion, true goat, and true dragon. As far as I know, there exists no triple chimaera nowadays unless it be the Axis. But the existence of two-type plant chimaeras can be proved by their behaviour and by microscopic examination of their cells. Their origin can be explained by a closely reasoned theory. The theory has been demonstrated by long series of experiments. There is good evidence that *C. adami* is such a chimaera, the outer layer of cells being *C. purpureus* and all the inner ones being laburnum. A twig of the plant might be likened to a cigarette, the paper representing *C. purpureus* and the tobacco representing laburnum.

Such a state of affairs fits in with some of the features of the tree. The general structure would be of the laburnum type because the skeleton and structure, as it were, is of that type and only the outermost skin of the other. As to colour, the underlying yellow seen through a thin window of purple produces an unattractive brownish pink. Reversion to laburnum is more frequent, and this accords with the fact that any slight damage whereby the outer skin was removed would give a surface of pure laburnum. Reversion to *C. purpureus* is less frequent, which accords with the fact that it is much more difficult to explain.

Let us now try to picture how the original specimen of *C. adami* came about. According to the theory, and according to what has actually happened in experiments with other pairs of plants (but not as yet with the two with which we are concerned) the process would be as follows. When in 1825 the particular grafting operation failed, the scion of *C. purpureus* died back but did not wholly die. The scab or

callus formed over the top of the severed laburnum standard contained some *C. purpureus* tissue. Now imagine an adventitious bud starting in a spot where the laburnum tissue was overlaid by a thin coating of *C. purpureus* perhaps only one cell layer deep. In such a case the upthrust of the laburnum tissue would operate much as did the terrestrial convulsions described in books on geology. These show the strata pushed up into a dome-shaped formation and yet retaining their order, layer by layer. The geologists speak of such a thing as being anticlinal while botanists use the word periclinal. If the top layer is one cell deep, it is said to be "monochlamydeous," if two cells deep, it is "dichlamydeous." By microscopic examination, by staining tests, and by chemical reactions, it has been demonstrated that the outermost layer of cells in *C. adami* is *C. purpureus* and all within is laburnum. Thus according to the system of terminology described, our subject must be called a "monochlamydeous periclinal chimaera." This is the generally accepted view, but, of course, there are difficulties in detail which still await elucidation.

It may be asked why these demonstrations have not been possible with *C. purpureus* and laburnum, and secondly with what plants it has in fact been done. The answer to the first question may, I think, be that the *C. purpureus* laburnum graft is not one of the easiest to make, because although the plants belong to the same order they are in different genera and have very different growth habits—one being a sprawling shrub with slender twigs and the other a small but erect tree which forms stout limbs. As to the second question, the experiments have been made with tomato and black nightshade which belong to the same genus and have similar habits of growth. They have also been made with forms of the garden geranium (*Pelargonium zonale*, L'Herit.). With these more accommodating subjects various types of chimaeras have been obtained. The outer layer encircling the inner tissues has been of different depth according to the varying thickness of the overlying coating at the callus. Moreover, adventitious buds have come just at the junction of the two types of tissue. The resulting shoots have been tomato on one side and nightshade on the other in differing degrees of regularity. Where the line of division came precisely in the middle there has been a symmetrically divided shoot reminding one of the halved gynandromorph butterflies or moths now and again met with.

All these matters are attractively dealt with in a book called "Plant Chimaeras and Graft Hybrids" by Professor W. Neilson Jones. The book belongs to a series of twenty small volumes comprising "Methuen's Monographs on Biological Subjects." Of these several treat of botanical matters and should, I think, be read by all botanists. There are several on the entomological side which are equally valuable.

[The ordinary use of the terms mono- and di-chlamydeous refers to the perianth whorls of flowers, e.g., dichlamydeous have both calyx and corolla, monochlamydeous a simple perianth.—K.G.B.]

PAROXYNA MISELLA, LW. (DIPTERA: TRYPETIDAE).

A POSTSCRIPT.

Plt. XII.

In the "Proceedings" for 1940-41 I recorded my failure to discover the breeding habits of this species. That paper* had hardly appeared in print before I was fortunate to find the gall and breed the fly. Early in June 1941 when visiting Mr R. L. E. Ford at Bexley, Kent, he told me that he had noticed some galls on *Artemisia vulgaris* growing on a plot of land belonging to him. I suspected that they might be those of *P. misella* and a search produced several terminal galls each containing a number of light-brown pupae which duly produced imagines of *P. misella* early in July. Subsequent search on some waste land at Eltham resulted in similar galls being found on the *Artemisia* there and the accompanying photograph was taken from one of these plants.

This species turns out therefore to be a spring gall-producer, which accounts for my failure to find the galls when previously searching in the late autumn. I myself have never taken the fly before full summer, but Mr Parmenter tells me he has taken it in April, which points to its being a hibernating species ovipositing on its food plant in the early spring.

I have to thank my namesake, Mr J. Andrews, for the photograph of the gall and Dr Blood for the enlarged photograph of a wing of *P. misella*.

H. W. ANDREWS.

*"Proc. S. Ldn. Ent. and Nat. Hist. Soc.," 1940-41, pp. 36-38. "*Paroxyna misella*, Lw. and *Oxya parietina*, L. (Diptera: Trypetidae). A Record of a Failure and a Success."



PAROXYNE MISELLA, LW.

Del. J. E. A.





R. W. ATTWOOD.

OBITUARY.

(Plate V.)

By the passing of Mr R. W. Attwood on 20th July 1941 the members of the South London Natural History Society lost one of their most active members. He was very regular in his attendance at both indoor and field meetings, and his tall figure and genial personality will long be remembered. His end came very suddenly whilst he was leading a field meeting at Oxshott, and was due to a heart attack. In the words of Mr L. G. Payne, who was with him at the time, "He just lay down and went to sleep in the woods amongst the creatures he loved so well."

Mr Attwood, who served with H.M. Forces in the Great War of 1914-1918, joined our Society in 1931, being interested in all branches of Natural History. His knowledge of Lepidoptera was extensive, and in later years he devoted much of his leisure time to the study of Coleoptera. He had a fine representative collection of both these Orders, and members will remember his regular exhibits at the indoor meetings. His appearance at the field meetings was always looked for, and his knowledge of the exact localities for some of the rarer species of insects was freely imparted to others who did not know the district so well.

Perhaps his leadership of the periodical visits to Benfleet will stand out particularly in the memory of the many who took part in these excursions. His parents—both of whom, alas, are with us no longer—resided there for some years, and a welcome always awaited us at their house, where refreshments were always offered and entomological reminiscences exchanged with Mr Attwood, sen., who had been a keen Lepidopterist in his younger days.

From time to time articles and notes from the pen of Mr Attwood appeared in the columns of "The Entomologist's Record," including his "Notes on Collecting at South Benfleet" (1937, pp. 47-49, 56-59).

He was a member of the Council at the time of his decease, having served on that body previously in 1933-4 and 1937-8.

He leaves a widow, a son (at present serving overseas with H.M. Forces), and a daughter, to whom our deepest sympathy is extended.

S. W.



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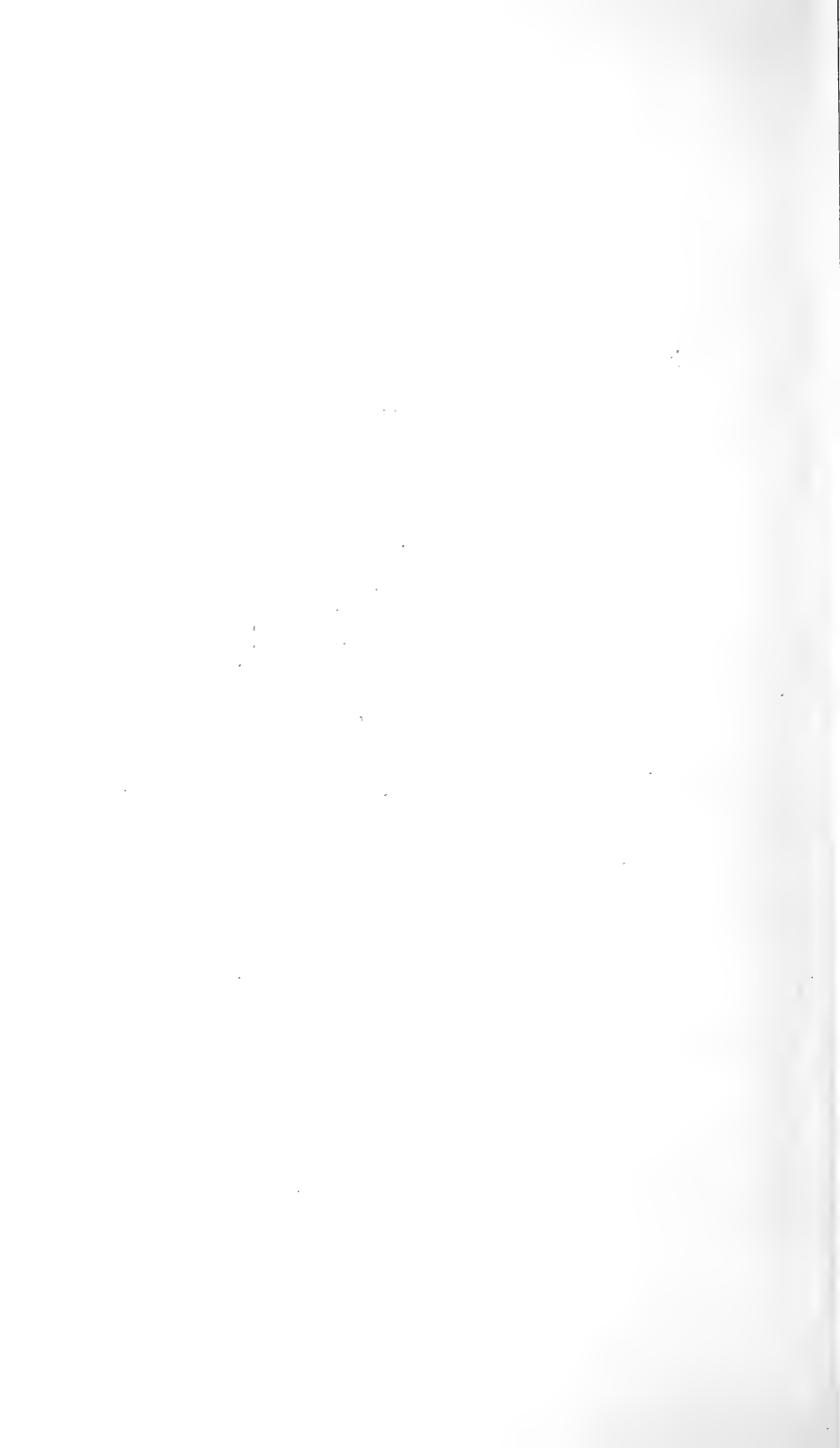
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PROCEEDINGS AND TRANSACTIONS
OF
THE SOUTH LONDON
Entomological and Natural History
Society

1942-43

PART I.

WITH 5 PLATES

PUBLISHED AT THE SOCIETY'S ROOMS
THE CHAPTER HOUSE, ST THOMAS' STREET, SOUTHWARK, S.E.1
15TH MAY 1943.

PRICE SEVEN SHILLINGS AND SIXPENCE



A SURVEY OF THE INSECT PANAXIA (64) (CALLIMORPHA) DOMINULA, L.

By H. B. D. KETTLEWELL, M.A., M.B., B.Chir., F.R.E.S.

No paper on any subject is complete and I am conscious that our present state of knowledge of this species is far from adequate. Furthermore, as more than half the material on which I am writing is (or was) on the Continent, it is impossible at this time to check up the many queries that arise in the course of investigation. However, it will serve to cut out some of the dead wood that exists in the way of synonyms. It will split off one distinct species which has long been dealt with under the name of *dominula*, namely *Panaxia rossica*, Kol., and it will leave a great deal of work to be done by others in the way of finally proving or disproving whether two other very distinct sub-species really belong to *dominula* or are themselves distinct species. I refer to *P. dominula*, subsp. *persona*, Hb., and *P. dominula*, subsp. *lusitanica*, Stdgr. Only when fresh material, from Italy and Portugal respectively, is available can this be settled.

For some years past I have been working on this species as I consider that it has many advantages over others and is likely to teach us a great deal. There can be few species which could be considered more of a "colony insect" than *dominula*. Small colonies exist close to others, and it is my belief that pairing *inter se* need seldom, if ever, take place. This is brought about, as will be shown, by:—

1. The habits of the imagines.
2. The date of emergence, which is very much affected by immediate environment.

It is therefore possible to see in these individual colonies what mutations have taken place, and eventually to visualize the age of these mutations. *Dominula*, ab. *lutea*, Stdgr., is obviously of great age as it appears occasionally throughout the range of the species. *Dominula*, ab. *bimacula*, Cockayne, is, on the other hand, of comparatively recent origin. One form may exist in a valley and another close by at a slightly different altitude, as is the case in the Dolomites, where *dominula*, subsp. *pompalis*, Nitsche, flies in the valleys, whilst typical *dominula* occur at a slightly higher level (1).

When one compares this state of affairs with what is more usually the case with other species, namely, that they hatch in one place and may die many miles distant, thereby tending to disperse rather than to localize a given mutation, it becomes obvious how great an advantage is to be anticipated.

Experimentally, the species is suitable to work with in that it is easy to rear (except for the ravages of the Chalcid *Pteromalus puparum*), but

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has the disadvantage in that one brood only can be bred per year with any certainty, although M. Matthes has obtained three (65), and that for accurate results the temperature should be controlled throughout the pupal period from heat or cold, as there is considerable evidence of phenotypic variation being produced by extremes of temperature in this state (Standfuss & Cornell).

HABITAT.

In this country *P. dominula* inhabits at least four different types of terrain:—

1. By far and away the most frequent, banks near chalk streams and rivers.
2. Banks near sandstone rivers (as in Devon).
3. Clearings and edges of certain woods.
4. Very rarely, marshes in sand-dunes.

The larva has certain requirements that must be fulfilled, and in the production of artificially produced colonies in this district it has been seen that if any one of these fails the colony does not survive. When present the colony thrives and may even expand. The following conditions are absolutely necessary:—

1. That the ground should not be flooded, nor should remain too wet for long periods at a time. A bank in wet ground is preferred. Flooded marshland is unsuitable, which may probably account for its apparent absence in the Norfolk Broads.
2. There must be a fairly thick undergrowth of mixed foliage, or alternatively a thick carpet of dead dried leaves from overhanging trees so that the larvae can hibernate in them.
3. Partial shade by trees or reeds is necessary.

As conditions alter through course of time, it sometimes happens that a colony gets cut off from its main origin, so that one may find this insect on the edge of a valley a mile or so from the river, still clinging to some few yards of bank year after year, and with no contact with surrounding colonies. Frequently these places appear most unsuited for the species.

LIFE HISTORY.

The egg, which is "a pale green hemisphere, shining and smooth, with no sculpturing but with a flattened base" (2), is laid loosely in June or July, so that it either falls to the ground or more frequently is arrested and held by the hairy leaves of Comfrey or Nettle.

In my opinion, the female usually lays her eggs in the immediate proximity of where she herself fed as a larva, as she rarely flies prior to copulation, which normally takes place the day of hatching, and seldom

takes to the wing before a considerable number of eggs have been deposited. About 300 eggs are laid, and usually a small percentage are infertile.

The larva feeds on *Symphytum officinale* (Comfrey), *Lamium album* (Dead-nettle), *Cynoglossum officinale* (Hound's Tongue), *Prunus spinosa* (Sloe), *Humulus* (Hops), *Rubus fruticosus* (Blackberry), *Salix caprea* (Sallow), *Senecio vulgaris* (Groundsel), *Parietaria officinalis* (Pellitory), *Mentha aquatica*, (Hairy Mint), as well as a variety of trees such as Ash, Hawthorn, Plum, and even Roses (3).

Before hibernation (in October) it can be beaten in hundreds from mixed vegetation in its localities. The young larvae feed high up and more exposed than after the winter.

About the middle of October the larvae take up hibernating quarters, usually within the curl of a dried leaf, and frequently gregariously. At this time it is about one centimetre in length, and larvae advanced beyond the third instar are frequently killed off in hibernation.

A few late larvae continue to feed on warm days throughout November, but in the months of December, January and February all feeding comes to an end, unlike *Euplagia* (64) *quadripunctaria*, Poda (*hera*, L.), where feeding never ceases.

In the first warm days of March the larvae are on the move, but prefer to feed under cover, though on some sunny days they feed exposed. Full growth is achieved in May, earlier or later according to the temperature and season.

The larva is easily found in numbers during the winter months by looking for the dried and withered stems of Comfrey which lie flat on the ground, diverging from their centre of origin. These are gently raised and shaken, and the curled up larvae will fall to the ground. I have taken between one and two hundred on a cold January afternoon at Dry Sandford by this means.

The larva is less easy to find on assuming full growth as it frequently rests low down on the ground, a foot or so from its food plant.

I wish here to record the fact that there are two distinct forms of the larvae in this country. (See Figs. 5 and 7 and 6 and 8, Plate IVa.)

Form "A." The larva has complete absence of all white marks both along the dorsal pattern as well as along the lateral yellow markings. The larvae appear much darker. (See Figs. 6 and 8, Plate IVa.)

Form "B." Has paired white spots lateral to the dorsal yellow pattern. It also has prominent white spots in the lateral pattern. As will be seen, this pattern in the two forms is quite different, (Figs. 5 and 7, Plate IVa.)

That the larva is dimorphic is not of particular interest, but the proportion of each form in different colonies may be of significance. So far, as I only noted this fact this year (1942), it appears that the Deal (Kent) colony produces a 100% Form "A." I believe that Dry Sandford produces a very high proportion of Form "B," Newbury larvae approximately 5% Form "A," and Bodenham (Salisbury) about

50%. How much significance this has, or what deduction can be drawn from it, or how constant the proportion remains, must be decided in the future.

I want also to record the breeding of a number of completely or partially melanic larvae after the severe winter of 1940. They occurred in all my broods quite irrespective of parentage or origin; prior to hibernation these larvae had shown the usual black and yellow colouration. However, immediately prior to the first ecdysis after hibernation certain larvae were noted in which the usual bright yellow became a dirty fawn. After completion of the moult these larvae were seen to be entirely black without any yellow pattern or white spots on the dorsum or lateral aspect. These larvae produced a *dominula* of the form which their previous genetic constitution alone had anticipated. I found also a wild melanistic larva at Deal in the spring of 1941. Newman has, I believe, previously recorded a melanic larva.

I consider mine were produced by abnormal weather conditions and environment. The leaves in which they were hibernating got wet and were frozen up for weeks on end, producing a very high larval mortality. Doctor Cockayne has, I think, two preserved examples of my melanics.

In nature *P. dominula* pupates just under the ground or in rubbish on the surface. Sometimes more than one are found together in the same cocoon (4). I found the pupae commonly in the chalky debris immediately beneath the cliff face at Kingsdown. Normally from four to six weeks are passed in this stage. At a temperature of 25° centigrade imagines (ab. *romanovi*) were produced in 11-20 days (5).

The imagines hatch in June or July, usually at that time of the day when the beam of the sun first strikes their site, usually the morning. The female after drying her wings rests quietly, and assembling may commence soon afterwards.

I have seen *dominula* assemble at 12 noon Greenwich time, and at 11 o'clock at night in the dark (6). As one female after another commences to assemble, the males leave one patch of herbage for another and do their to-and-fro dance in their scores, over the fresh attraction, eventually descending lower and lower until they flutter from leaf to leaf, taking a considerable time to find the female.

Between these pairing flights the males usually congregate on the highest shrub or tree in the immediate vicinity. On certain hot nights at dusk they indulge in a mad flight around one or more such trees in their hundreds, and this may last well on into the twilight.

Experimentally, I find that nearly every male released returns during the course of the day to the assembling females in the colony, and I believe that, except for the evening dance just described and which only happens on occasions, the flight of the male is practically entirely dictated by the female.

In this country, and more so abroad, both sexes, frequently spent examples, may be found on certain flowers in the sunshine:—*E. canna-*

binum (Hemp Agrimony), *Centaurea nigra* (Knapweed), *Carduus* (Thistle), and on the Continent on Lime flowers (4), always in the immediate vicinity of a colony.

PARASITES.

So far as I know, the egg is unaffected by any parasite. In the larva the commonest disease probably occurs immediately prior to full growth, and is most likely bacterial. The larva suddenly becomes limp and suffers from a watery diarrhoea. Late larvae are more frequently affected by this.

In the "Ent. Rec.," Vol. 41, p. 8, 1929, I recorded a number of "stung larvae." I was almost certainly referring to this bacterial condition, as I have never met *Ichneumon* infection.

In 1939 I introduced the common *Ichneumon* which infects *Parasemia plantaginis*, L. (unidentified by me) into a tin of three day old larvae of *dominula*. With *plantaginis* larvae of the same age the flies immediately seized the tiny larvae between their legs and were seen to plunge the ovipositor into their backs. The larvae invariably curled up and struggled so that both fell to the ground interlocked.

In the case of *dominula* larvae, these *Ichneumons* seized them in just the same way but on no occasion succeeded in effecting ova deposition, and after the first attempt ceased to take interest in the larvae.

By far and away the commonest and most constant infection takes place in the pupal stage by the common Chalcid fly, *Pteromalus puparum*. Whole broods are decimated, and as the fly appears to have a rapid life history, the numbers go up as the season advances. It was probably this infection which destroyed a large part of Goldschmidt's 6000 caterpillars, which died shortly after pupation (35).

I have found no fungus diseases among them.

FERTILITY, ETC.

As already stated, it is usual for a small proportion of the ova laid by a female to be infertile.

In certain seasons, particularly very hot ones, it sometimes happens that practically all moths in captivity, and there is also evidence in nature, are infertile. In the hot season of 1941 this took place in nearly all my broods. Many of the moths showed little inclination to pair, and when they did the resulting ova were all infertile.

Some years ago L. W. Newman collected larvae of *dominula* from the Tubney Wood (Oxford) locality, in which it was swarming. Of the resulting imagines none laid fertile ova. The following year he found that it had completely disappeared from this locality, nor to my knowledge has it been taken there since.

This may also account for its rapid disappearance from Wicken Fen about 1874 (8), and elsewhere.

Experimentally, forced examples in which the pupae have been subjected to heat, are usually found to be infertile. The explanation is

probably found in that the sex cells, male and female, are undeveloped, due to the speed of metamorphosis, so that maturation is incomplete and conjugation impossible.

Preferential pairings are very evident. It may be impossible to get two moths to pair, yet each will produce immediate and fertile pairings with other individuals.

SEPARATION OF *P. DOMINULA*, L., INTO TWO DISTINCT SPECIES.

In order to be able to tabulate the various subspecies, I wish here to split off from *P. dominula* a good species which was originally described by Kolenati as a variety of *dominula*, in "Mel. Ent.," 95 (Petropoli, 1846) in an article headed "Insecta Caucasi," in which he says:—"Var. a. Treitschke *rossica*, Kolenati, 'alis posticis et abdomine luteis'."

We must accept it that he had a Russian example in front of him when giving this description, both because of the name he gave to it—*rossica*—and because he expressly states "Occurrit tantum in Russia et Transcaucasia." He incorrectly assumed that it was identical with a "yellow hindwinged *dominula*" he believed Treitschke had figured as "Var. a." He was wrong in that, first of all, Treitschke had figured no such *dominula* var. a, and in all probability he was thinking of Boisduval's *dominula* var. a in "Genera et Index Methodicus," 1840, who gave substantially the same description, "alis posticis abdomineque luteis," to it. He was wrong also in that this insect (var. a, Boisduval) is now recognized not to be the same as the Russian yellow examples.

It is therefore correct to refer to these Russian insects as *rossica*, and to describe it now as a different species distinct from *P. dominula*, under the name of *Panæcia rossica*, Kolenati. (Plate I, Figs. 1 and 2. Plate III, Fig. 4, for comparison of underside with *P. dominula*, Fig. 9.)

P. rossica differs from *P. dominula* in the following points:—

1. The presence of an extra black spot on the hindwing, commencing at the costa and internal to the discal spot. This spot is more marked on the underside and varies in size in different individuals, and is always present on the underside in all examples of *rossica* and its subspecies seen by me. It is always entirely absent in *dominula* and its subspecies.

2. The central black stripe of the abdomen is composed of a series of triangular black markings with the base of the triangle placed immediately on top of the triangle beneath it.

Most marked in *P. rossica* and to a lesser extent in subspecies, this arrangement is never seen in *dominula*.

3. All the markings of the forewings are uniformly white or just off white.

4. The ground colour of the forewings is "a brilliant green" (9), and quite different from that of *P. dominula* and its subspecies.

5. The larger size of the insect, together with the slightly different contours, make this insect appear a different shape from *dominula*. In particular, the head and palpi of *rossica* appear more prominent than in *dominula*. In the mountain subspecies *teberdina*, Sheljuzhko, the size is decreased, however, to that of normal *dominula*.

6. The black markings on the hindwing are uniformly larger than in *dominula*. The so-called "var. *persica*, Le Cerf," appears to be an exception to this.

7. Marked differentiation in the genitalia. (Plate IV, Figs. 1, 2, 3, 4.) The genitalia of male *rossica* and *dominula* are quite distinct. The most important and obvious feature is that in *rossica* the inner edge of the valve terminates distally in a sharp point. This is never the case in *dominula*, in which species the termination of the valve is always rounded. There are other less obvious differences. The inner curve proximal to the point in *rossica* is not so acute as in *dominula*, in which it is sharply defined.

Differences in the female genitalia are less obvious. However, in *rossica* the 8th sternite is narrower than in *dominula*, and the ostium bursae is rather broader.

These differences were pointed out by W. H. T. Tams in 1940, who was good enough to examine the genitalia and photograph them for me, and were subsequently checked by Dr E. A. Cockayne and myself in 1941.

We are therefore able to separate:—

1. *P. dominula*, L., and its subspecies spreading West from Asia Minor through Europe, from
2. *P. rossica*, Kol., and its subspecies having a limited Eastern range in and around the Caucasus.

I. DISTRIBUTION OF *P. DOMINULA*, L., AND ITS SUBSPECIES.

Typical *dominula* as described by Linnaeus in 1758 are found locally throughout Northern and Central Europe. Standfuss gives Norway and Sweden (5), and Spuler gives Stockholm and St Petersburg (Leninград) (43).

From the West typical *dominula* are found from Spain (47), throughout France, England and Germany to East Prussia; in the Balkans to Bulgaria and Turkey to its most easterly point in Bithynia.

In the extreme West and South, however, it is replaced by several well-marked subspecies. In the West in North Portugal subsp. *lusitana*, Staudinger, with its twin ab. *bieli*, Staudinger, occurs. In the South in Italy a group of subspecies which are modifications of subsp. *persona*, Hübner, ab. *italica*, Standfuss, takes its place. Besides these two main and distinct subspecies there are a number of local and less extreme subspecies. For the most part these have arisen from the geographical limitations in areas circumscribed by mountains:—

Subsp. *pompalis*, Nitsche (Synonym, subsp. *subalpina*, Dannehl) in Southern Tyrol and Dolomites. Subsp. *rhodanica*, nov. subsp.: A dis-

inct subspecies which occurs along the Rhone Valley in Valais, Switzerland, hitherto unnamed but incorrectly referred to as subsp. *bithynica*. Subsp. *bithynica*, Staudinger, from Bithynia in Asia Minor, just East of the Dardanelles.

So far as I know this is the most easterly part of the range of *dominula* before being replaced by *P. rossica* some distance further East.

So much for the general outline for the range of *P. dominula* and subspecies. Each of these will be described at length later.

P. DOMINULA IN THE BRITISH ISLES.

COUNTY LISTS, ETC.

Oberthür, quoting Barrett, stated in 1911, "At one time the species was much more abundant and widely distributed in Great Britain than it is to-day" (10). Although this may well be the case this species is still widespread, though very local, and is easily overlooked. There are no records from Ireland or Scotland. In England it is found as far North as North Staffordshire. The home of the species seems to be in the Hampshire and Dorsetshire district, along the valleys of the rivers Itchen, Test, Avon, Trent, and Frome.

The following is a summary of County Lists that does not pretend to be complete:—

KENT: All the records under the name of "Deal," "Walmer," and "Kingsdown" refer to the stretch of undercliff extending from St Margaret's Bay as the southern boundary to the Rifle Butts, Kingsdown, at its northern end.

More recently the sea has encroached and destroyed the whole of the St Margaret's Bay end except for the last few hundred yards to the North of the Bay, and from there to the undercliff where it meets the road the species still swarms in countless thousands.

This colony is quite unlike any others in this country, and *dominula* coming from it can in most cases be recognized from those from other localities. In many ways it can be compared with North French *dominula*, with which undoubtedly it had fairly recent connections.

The colony faces East and South-East so that the majority of it gets no sun after mid-day. Imagines are out from the last week of June to early August, when the Hemp Agrimony comes out, and on which they may be seen sitting in hundreds. The numbers seem to vary from season to season.

In 1900 it was reported that "larvae were comparatively scarce" (11). In 1902 they were fairly common (12). In 1896 they had been "excessively abundant" (13). More recently in 1923, '37, '39, '40, '41, '42 I found them abundant.

NORTH KENT: In Newman's British Moths he records *dominula* as occurring "in an old gravel pit on the London side of Dartford."

I note that there are nine specimens in the Tring Museum labelled "Woolwich, 1899. Smart."

SUSSEX: Chichester: June 1899.

Brighton: Near race course, last in 1929 by Major Blackistone. I visited this locality twice in 1941 but found none. There was plenty of Comfrey. Also very local in certain woods in Sussex.

HAMPSHIRE: Ringwood: Certain colonies to the North. I have not found it South of Ringwood.

Winchester: Common. Locally common near Stockbridge (H.B.D.K.).

Twyford and Romsey (14). Hampshire County List also gives:—Swathley: Scarce. Eastleigh, Bishopstoke: Abundant. Winton, Shawford: Abundant. Nursling: Common. And South of Newbury.

DORSETSHIRE: As already stated, I have found it locally common along the Frome and Trent (1939).

Sherborne: "On July 18th and the following days, the imagines swarmed in hundreds near a small wood on Tenby Common, Sherborne" (15).

DEVONSHIRE: The species is well represented in the South of the County in local separated colonies. E. Parfitt in "Fauna of Devon" (16) mentions the following places:—Axminster, Buckleigh Vale, Chagford, Yealmpton, Dartmouth (abundant), Exeter, Ivybridge, Kingsbridge and Teignmouth. Also "borders of Dartmoor" (17). There was a small colony by the sea near Paignton till recently, but it is now extinct (P. Milman).

The late Mr Pennington found a colony by the roadside near Ashburton.

There are three specimens in the Tring Museum labelled "Seaton, 1903."

WILTSHIRE: As already stated, it is widespread but local along the Avon Valley, sometimes a long way from the river but always in the valley. Also on the upper reaches of the Kennet beyond Hungerford.

BERKSHIRE: Very common in the Kennet Valley in well-defined colonies. Definitely prefers the banks of the accompanying canals to those of the river at Newbury, almost certainly due to flooding (H.B.D.K.). Also Reading (18).

The famous Dry Sandford colony is found in the North of the county on a tributary of the River Thames.

ESSEX: I have never seen a typical *dominula* from this County. There are, however, a number of the Italian race subsp. *persona* in collections labelled "Essex."

In B. W. Adkin's collection there is one of these labelled "Horne Collection, 1906, G. H. Buchan ex larva, Essex."

Another in the British Museum labelled "Bred, 1893, F. Madison Collection." This can be traced through Steven's Catalogues to "Ex Essex larva." (There are also quite a few specimens of ssp. *persona*, ab. *italica*, labelled "Kent.")

My personal view on this is that these are either deliberate fakes or the progeny of introduced specimens from Italy. They are recorded at a time when collectors became interested in aberrations of this species, and when high prices were being paid, which is always an encouragement for introducing foreign material. There are three specimens of *dominula* labelled "Epping, H. Doubleday, 1846" (63). This should be a reliable record.

HERTFORDSHIRE: Larvae recorded as being in large numbers near Hertford in 1903 (19). A single specimen was taken on a doorstep in Hitchin in 1872 (20). More recently in 1912 larvae were taken near Ickleford (Palmer).

OXFORDSHIRE: There is a colony near Weston, north of Oxford. I have so far failed to find it here.

GLOUCESTERSHIRE: Found in many places, but existing records are mostly old. The "Proceedings of the Bristol Natural History Society" give Blaise Woods, Bristol, Bussage near Stroud, and also near Woodchester, Clifton Down (1 specimen). Other records include:—"Hills near Gloucester (21), Selsley (22), Stonehouse and Minchinhampton (Austin Richardson).

SOUTH WALES: Carmarthen: There are eight specimens in the British Museum Collection labelled "Carmarthen, 12.5.1916, Lort Phillips Collection."

Newman's "British Moths" gives Tintern Abbey. In July 1941 R. P. Demuth found imagines common "sitting about around a lagoon situated in sandhills and flying in the sun near Pendine." Pembroke, Tenby (K.J.B.).

SUFFOLK: In "Lepidoptera of Suffolk" (23) the following is stated:—" *Callimorpha dominula* very rare and now probably confined to Barton Mills, Kesgrave (a few larvae), Tuddenham, Mildenhall, and specimens on the wing at Barton Mills (T. & J. Brown), ante 1890. Our sole later records are of two taken at Barton Mills in June 1896 by the late E. G. J. Sparke, and now in his collection in Bury Museum, and one at Brandon, 5th July 1937, Hawley."

In 1938 T. G. Howarth observed imagines flying freely around trees near Brandon.

CAMBRIDGESHIRE: Wicken Fen (24): F. D. Wheeler writing in 1879 states " *Callimorpha dominula* used to swarm at Wicken. On May 7th, 1873, Mr Fletcher and I collected in a few hours five hundred and eighty-two larvae, almost all from one patch of dwarf willow, and could have taken hundreds more without stirring twenty yards. There must have been very many thousands in the

square mile or so constituting Wicken Fen. The species is still there but in very diminished numbers. The very next season, happening to want a few larvae, I was quite five hours in collecting three dozen. I may mention that a good number of these *dominula* were turned out at Ranmore Fen in Norfolk, but don't appear to have thriven, for I never saw it there since."

In 1899 W. J. Kaye (25) records "*Callimorpha dominula*, once abundant, now absent from the Fen." It has not been taken since. The colony which existed at this time at the entrance to Chippenham Fen has similarly vanished.

STAFFORDSHIRE: South Staffs: Major Blackistone of Hove tells me that he found the larvae fairly common in Himley Woods on nettle.

NORTH STAFFS: Mill Dale: There are four specimens in the Tring Museum labelled "Mill Dale, North Staffs, 1914. Vauncy Harper Crewe." (Mill Dale is described as "narrow path between limestone cliffs on the north-east border of Staffordshire between Allstonefield and the River Dove.")

From this list, though incomplete, it can be seen that the insect is widespread but local, which does not justify Dr Cockayne's opening remark in his most excellent paper on "Variation in *Callimorpha dominula*, L." (26) in which he refers to "its small range here."

CONTINENTAL DISTRIBUTION OF PANAXIA DOMINULA, L.

SPAIN: Treviso, Picos d'Europa, Reich (47). Probably found in many places.

FRANCE: Occurs locally in many and widely separated parts of the country:—Near Paris, Montmorency (J. Oberthür), Chartres, Cauterets, Vernet-les-Bains, Besançon, Digne, Le Lauzet (Basses-Alpes), Pyrenees Orientales, between Villefranche-de-Colfnet and Montelouis, probably also in Brittany (Ille-et-Vilaine).

GERMANY: Appears to occur from north to south:—Gr. Raum near Königsberg, Prussia; Saxony, Bavaria (Fuerth), Württemberg (Schwabisch Gmund), Elberfeld (Newiges), Weilburg (Lahn), Frankfurt, Diekscheid (Upper Wisper), and Bornich.

BALKANS: Typical *dominula* seem to occur in Jugoslavia (Fiume), Bulgaria, at a height of over three hundred feet at Chepino, and also Mt. Vitosh.

TURKEY: Isle of Mytilene—one of its earliest localities to be discovered. Ismid. Around Broussa in Bithynia typical *dominula* is replaced by subsp. *bithynica*.

CLASSIFICATION OF SUBSPECIES OF PANAXIA DOMINULA.

1. Subsp. *lusitanica*, Staudinger.
2. Subsp. *persona*, Hübner, and associated subsps.:—

- 2a. Subsp. *majellica*, Dannehl.
- 2b. Subsp. *pompalis*, Nitsche.
- 3. Subsp. *rhodanica* (nov. subsp.).
- 4. Subsp. *bithynica*, Staudinger!

1. *P. DOMINULA*, SUBSP. *LUSITANICA*, STAUDINGER (27).

(Plate I, Figs. 3 and 4.)

This local race occurring near Geres, in North Portugal, was first described and named by Staudinger in 1895, having been previously discovered by E. Biel.

The imagines appear quite distinct from typical *dominula* in the following points:—Colour of hindwing; colour of forewing spots; shape of wings.

There is no evidence at present that it is anything other than a very distinct subspecies. The genitalia are identical with those of *Panaxia dominula* in both sexes.

I have examined all the *lusitanica* in the British Museum, Oberthür, Joicey and Tring Collections, as well as specimens J. T. Wattison of Shrewsbury was good enough to lend me taken by him near Geres some years previously.

There appear to be four different combinations of colour, producing four different facies:—

- 1. Forewing spots all orange-yellow (orange-gelb). Hindwing ground colour orange-yellow.
- 2. Forewing spots all white except basals, which are faintly yellowish. Hindwing ground colour orange-yellow.
- 3. Forewing spots all orange-yellow. Hindwing ground colour yellowish-red (gelbroth).
- 4. Forewing spots all white (except basals). Hindwing ground colour yellowish-red.

It therefore appears that the genetic control of the colour of the forewing spots, and that of the ground colour of the hindwings, are inherited as two separate independent factors.

There is a good deal of variation in the depth of the yellow-red colour of the hindwings (forms 3 and 4), and all gradations from yellow-red to brick-red are to be found, but in no case is the red quite so deep as in *Panaxia dominula*.

Staudinger states that he considers there are two forms occurring near Geres and "that the localities where Biel had found these two forms were not far from each other but were situated at different altitudes, although they were not sharply divided from each other." Staudinger in conclusion states that whether the *lusitanica* occurs at a higher altitude than *bieli*, Staudinger, or whether both forms occur in approximately equal numbers in certain localities can only be decided by further observations.

He states expressly that his *lusitanica* refers to those insects with orange-yellow (orangegeleb) hindwings ("as in *rossica*") and all the spots on the forewing a deep orange-yellow (gesättigt orangegeleb). His *bieli* refers to insects with forewing spots orange-yellow, but hindwings a yellow-red (gelbroth).

It therefore appears that in naming these two forms he was referring to hindwing distinctions only. All orange-yellow hindwing examples from Geres should therefore be referred to *lusitanica*, and those with orange-red hindwings to *bieli*.

Further naming appears quite unwarranted and unnecessary.

He states also that specimens captured wild may have all forewing spots white with yellow hindwings. "That var. *rossica* therefore occurs as an aberration near Geres."

This of course is entirely incorrect as these insects have only a superficial resemblance to *P. rossica*. The fact that the basal spots appeared white is almost certainly due to weathering (*vide infra* ab. *hamalensis*, Pflumer.).

CONCLUSIONS.

In North Portugal there occurs a race of *P. dominula* in which two factors are working. One controls the colour of the forewing spots, the other the ground colour of the hindwings.

The genetics of these two factors, which work quite separately, is at present unknown.

Staudinger's type for *lusitanica* has yellow hindwings, and the red hindwings examples should be referred to *lusitanica*, ab. *bieli*.

2. SUBSPECIES PERSONA, HÜBNER.

Subsp. *persona*, Hübner (1790). Synonym, *donna*, Esper, 1794. (Plate I, Figs. 5 and 13.)

Ab. *italica*, Standfuss, 1885. Synonym, *donna*, Costa (31), 1842. (Plate I, Fig. 7.)

Ab. *nigradonna*, nov. ab. (Plate I, Fig. 6.)

Ab. *postochrea*, Stauder, 1925.

Ab. *romanovi*, Standfuss, 1896. (Plate I, Fig. 14.)

Ab. *intermedia*, Rocci, 1913.

Ab. *subitalica*, nov. ab.

Ab. *insubrica*, Wackerzapp.

NOMENCLATURE.

Panaxia dominula in Italy has a large number of names, forms and aberrations. Most of these refer to insects with modifications built up on what is the original Italian prototype, subspecies *persona*, ab. *italica* (28).

Unfortunately for us, Hübner in 1790 chose as his type for *persona* (29) not this prototype but an *italica* with one of these modifications superimposed on it. Being the oldest name (ninety-five years before *italica*), it must automatically be held for the subspecies. We now know

that "*persona*" and "*donna*," so called, are in fact *italica* with one and two factors respectively added to it (*vide infra*). Nevertheless, "*italica*" and "*donna*" must be considered as aberrations of subspecies *persona*. Although this complicates things, there are many parallel instances of this kind.

The name "*donna*" presents a further and separate series of complications. Oberthür in "*Etudes de Lep. Comp.*," v, 1911, page 11, points out that Esper in 1794 (30) figured the same insect which Hübner had figured in "*Beiträge*" when he named it *persona*. Herr Gerning was responsible for sending this insect to both.

Esper's *donna* was therefore, without doubt, still-born. Costa in 1842 (31) figured under the heading of *Callimorpha donna*, Esper, two ab. *italica*. The name *donna*, Costa is a primary homonym of *donna*, Esper, and invalid.

We are therefore left with subsp. *persona*, ab. *italica* referring to the least marked of the usual Italian *dominula*. Subsp. *persona*, Hübner, represents those insects with a moderate increase of black on the hindwings, and in which there may be a ray-like pattern towards the base (=ab. *italica* plus factor A). This leaves the darkest and nearly all-black *persona* (=ab. *italica* plus factors A and B) unnamed.

For many years now, however, authors have, by habit, referred to these darkest examples as "*donna*," and a great deal of confusion will be added to the present medley if these are given an entirely new name. In order to conform with the ethics of nomenclature, and at the same time to cause as little disturbance as possible, I suggest the name ab. **nigradonna**, nov. ab., is given to these.

STATUS.

The Italian races of *dominula* (with the exception of Piedmont) differ from typical European *P. dominula* very markedly, in fact they do not superficially resemble the same insect.

For some time I had held the view, in common with others, that they would probably constitute a species distinct from *dominula*. However, in this present survey I shall endeavour to show that it merely differs from nominotypical *dominula* by the addition of two genetic factors, and that these factors can, and do, exist separately in local races of *dominula* on the boundaries of the range of subsp. *persona*, ab. *italica*.

If these suggestions which I am about to put forward are proved correct, there will be no doubt of its position as a subspecies of *P. dominula*.

I will tabulate the known facts for and against this supposition.

INDICATIONS OF DISTINCTION BETWEEN EUROPEAN *P. DOMINULA*, L., AND SUBSPECIES *PERSONA*, HÜBNER.

A. Appearance:

- (a) Hindwing red replaced by yellow.

- (b) The body always steel-blue. At the most there are four yellow dots present along the lateral line.
- (c) Diminution of all forewing spots along with some increased black markings of hindwing, which even in *ab. italica* is usually in excess of *dominula* typica. The small yellow streak situated on the inner margin near the base, very constant in *dominula*, is frequently absent, or represented by a small spot.
- (d) The shape of the wings differ. Much more pointed and narrower in subsp. *persona*.

B. Dr Passerini states that he can recognize the difference between *dominula* larvae and those of subsp. *persona* (33).

C. Standfuss states (5) "There is a difference in the scent of assembling females which is found also in the females of local races of the same species, as has been made clear to me with *Callimorpha*, var. *persona*. The males of *C. dominula* will at times pair with freshly hatched females of var. *persona*, whilst they ignore them if freshly hatched females of *dominula* are present."

D. The pairing of *dominula* \times subsp. *persona* is little fertile (Goldschmidt) (35).

E. There is a high mortality rate in the hybrid larvae. In Standfuss's broods he succeeded in rearing only 12%, 40% and 22% of his larvae respectively (5).

F. The hybridization of *dominula* \times subsp. *persona* has not produced uniform results. In Standfuss's first experiment (5) he produced a proportion of the F1 generation with yellow hindwings. This was not repeated in his subsequent similar pairings, and the yellow behaved as a recessive to red, although dominance was incomplete and intermediates occurred. He decided that the origin of the yellow examples in this brood was due to the constitution of the σ *P. dominula*, suggesting that it was heterozygote to *ab. lutea*, Staudinger. ("Such yellow examples as are found throughout the whole range of distribution of the species.") This was a very likely suggestion, but its validity is only assured if the gene which controls the yellow of *ab. lutea* is the same as the gene complex which controls the yellow in *persona*. There is definite evidence that this is not so, and the occurrence of yellow *dominula* in a larger proportion of red ones in his first brood could be accounted for on the assumption that the chromosome number is different in the two, with the consequentially altered conjugation of chromosomes.

INDICATIONS THAT *P. DOMINULA*, L., AND SUBSPECIES *PERSONA*, HÜBNER,
ARE NOT SPECIFICALLY DISTINCT.

- A. The occurrence in Piedmont in the same colony of typical *dominula*, yellow *dominula* (Italian yellow) (*vide infra*), and intermedi-

ates (32). Hybrids occurring in nature are comparatively rare even on the extreme range of a species.

- B. Similarly, the occurrence in the Dolomites of "red *italica*" (=subsp. *pompalis*, Nitsche), in which the "primary melanistic factor" of subsp. *persona*, ab. *italica*, appears dissociated from the yellow. The existence of a new species built up on two separately inherited factors, each of which can appear independently, is untenable.
- C. We are entirely unable to see any constant differences in the genitalia of both sexes between *P. dominula*, L. and subsp. *persona*, Hübner (W.H.T.T., E.A.C., and H.B.D.K.).

DISTRIBUTION.

Subspecies *persona*, ab. *italica*, is distributed from North to South Italy. In Liguria it occurs apparently free from any secondary melanistic factors (= " *persona* " and ab. " *nigradonna* " do not occur here). Ab. *italica* also occurs near Turin and Valgae in Piedmont (32). In Central Italy and Tuscany " *persona* " occurs along with a proportion of ab. *italica* and ab. *nigradonna*. The same state of affairs is found in Campania near Naples, in fact Hübner's type came from the collection of the Queen of Naples (Oberthür). There are several in the Oberthür Collection labelled " Naples." Further south still ab. *italica* and its melanistics are found together in Calabria and in Sicily (43). On the other side of the Apennines, in southern Abruzzi, subsp. *persona* is replaced by subsp. *majellica*, Dannehl (*vide infra*), local, standardized, and distinct from the rest, though retaining a number of characteristics in common with subsp. *persona*, with which, to the best of my knowledge, it is never found. The *dominula* of Piedmont in North-West Italy are dealt with elsewhere.

GENETICS OF *P. DOMINULA*, SUBSPECIES *PERSONA*, AB. *ITALICA*, AND AB. *NIGRADONNA*.

The yellow colour of the hindwings in Italian *dominula* is recessive to the red of *dominula*. The genetics of the melanistic factors producing ab. *nigradonna* from ab. *italica* have been worked out by Goldschmidt in 1924 (35). He showed that the darkening of the wings in the production of ab. *nigradonna* is brought about by two coupled factors. In ab. *italica* these are absent and may be represented by aa bb, in "light *persona*" by Aa bb; dark *persona* AA bb, light *nigradonna* AA Bb, and darkest *nigradonna* AA BB.

A pairing of Italian *nigradonna* ♂ with a normal red German *dominula* ♀ produced light *persona* and light *nigradonna* in the F1 generation. The original *nigradonna* therefore was heterozygous to both. The colour of the hindwings was intermediate between yellow and red with considerable variation. In the F2 generation, the red and yellow colours divided simply in the ratio 1:2:1. It therefore appears that the

red of *dominula* has not complete dominance over the yellow of *persona*. (This explanation of incomplete dominance would not explain Standfuss's abnormal brood, previously mentioned, in which "the greater part of the brood had yellow hindwings, and a smaller portion red." It appears that, according to him, this brood fell out into two distinct groups.)

A criticism of Goldschmidt's work is that he was able to breed so few examples that his findings are inconclusive. What Goldschmidt unfortunately did not elucidate was the difference between his "*italica*" (represented by aa bb) and normal *dominula*, in particular the black body of "*italica*." I refer to this as "the primary melanistic factor" as distinct from the two secondary factors which he pointed out. I suspect that this factor is unifactorial, and that there may therefore be three factors in all, and not two, built up from normal *dominula* in the production of *nigradonna*. I consider this point, the breeding of ab. *italica* (aa bb) \times *dominula*, of fundamental significance and one on which a complete understanding of the Italian races depends.

Goldschmidt has proved undoubtedly the presence of two factors which are necessary in the production of *nigradonna* from *italica*. His findings, as he points out, are to a great extent verified by the figures of the wild population from Gran Sasso d'Italia, and in this case he had one hundred and twenty-seven specimens to work on, which worked out thus:—

		Light		Light.		
		<i>italica.</i>	<i>persona.</i>	<i>persona.</i>	<i>nigradonna.</i>	
		aa bb	Aa bb	AA bb	AA Bb	
				AA Bb	AA BB	
Expected	...	7.95	31.75	47.6	31.75	7.95
Actual	5	27	52	35	8
Ratio	1	4	6	4	1

I have gone over Oberthür's specimens; bred from wild larvae collected from Vallombrosa, which were given him by Verity (10). There are seventy-one labelled "*Italie Vallombrosa ex Verity, Juin 1907.*" I find it extremely difficult to separate *persona* from light *donna*, and certain insects could fall into either group. They appear in the following groups approximately:—

		Light		Light.	
		<i>italica.</i>	<i>persona.</i>	<i>persona.</i>	<i>nigradonna.</i>
Actual	.....	5	14	24	20
Expected	...	4.43	17.75	26.61	17.75
					8
					4.43

They go to corroborate in the main Goldschmidt's findings. These figures seem to conflict, however, with Oberthür's view of his own brood, for he states "one-third produced *italica*, one-third *persona* (Oberthür does not recognize "*donna*"). By *persona* he includes the darkest and blackest examples of the Italian race, thus:—"This form of *persona* is always extremely melanistic on all four wings, where the extension of the black colour may reduce the yellow to a mere trace." The last third

was represented by "individuals intermediate between *italica* and *persona*."

Oberthür also states he had "sixty specimens from Verity's larvae." It would appear, then, that he was making the above statements from memory.

It will be seen, therefore, that Italian *dominula* have been in a state of high mutation in the past, and that in the main this has developed in two separate lines:—Firstly, the replacement of the red of the hindwing by yellow, and secondly, an increase in the normal black markings of the body and of the wings, with considerable diversity of pattern. This is controlled by at least two, and probably three, factors. These factors arose as either polymerous darkening factors or as multiple allelomorphs.

2A. SUBSPECIES MAJELICA, DANNEHL (36).

(Plate I, Fig. 12.)

This race appears to be fairly constant, and differs from subsp. *persona* and its aberrations in the following points:—

1. In size it is much smaller.
2. Hindwings yellow, with a wide and unbroken black marginal band more or less evenly edged on the inner side, and showing no inclination to form ray-like extensions as in subsp. *persona*.
3. Forewings very glossy green. White markings, normal but small. Body black as in subsp. *persona*.

In the Tring Museum there is a small series of subsp. *majellica* in bred condition. There are also with them a few identical in size and markings but in which the yellow is replaced by red. These are labelled "Volker, 1930, Rom.-Obsc." It therefore appears that they are the result of breeding red *dominula* with subsp. *majellica*. In this case it would appear that the black marginal band is inherited as a unifactorial element, possibly dominant. It occurs in Southern Abruzzi, Italy.

AB. ROMANOVI, STANDFUSS (5).

(Plate I, Fig. 14.)

In 1896, Standfuss, who was attempting to investigate the effect of sex on reciprocal crosses, published an account of his results in pairing *dominula* ♂ × subsp. *persona* ♀, and its reverse cross. In doing this he produced in the F1 generation a series of insects for the most part with red and intermediate hindwings, but with increased black markings, as in subsp. *persona*. As he did not expressly state to which of the Italian groups (*italica*, *persona*, or *nigradonna*) the original parents were related, we are unable to draw any definite conclusions from his experiments about the heredity of their black markings. (Since repeated, Goldschmidt.)

Ab. *romanovi* refers to all insects bred as a result of the cross *dominula* × subsp. *persona*. It is therefore most unsatisfactory, as it includes all possible combinations in all generations, and for the purpose

of analysis I suggest "red," "yellow," or "intermediate" *romanovi* and also the numerals "0," "1," "2," "3" be attached, comparable to the melanistic factors 0, 1, 2, 3 of *dominula*, *italica*, *persona*, *nigra-donna*, referring to the colour on the one hand and the degree of darkening of the wings on the other.

In the Oberthür Collection there are some thirteen specimens labelled "*romanovi* Italie" bred by Schiller, varying from "red *romanovi* 0," quite indistinguishable from *dominula typica*, to four examples of "*romanovi* 3," two red and two yellow.

A point of interest is the colour of the bodies in relation to the darkening factor. This appears to be inherited independent of the degree of darkening of the wings.

There is a "*romanovi* 2" with the red body of *dominula* with black dorsal stripe. Conversely, there is a "*romanovi* 0" which appears as a typical *dominula* with black body with small lateral red dots. This point is also borne out by Standfuss's figures of his "*romanovi*" in the "Handbuch." Here, then, is further evidence that the "primary melanistic factor" as found in ab. *italica* is inherited as a factor apart from Goldschmidt's A and B.

Lastly, in the Oberthür Collection there are two specimens labelled "*romanovi* \times *rossica*" (= ab. *lutea*, Staudinger) with light red hindwings. (Unfortunately, this proves nothing. If the gene-complexes of *italica* and *lutea* were the same, 50% of the offspring would have had yellow hindwings.)

Finally, there is a specimen of wild caught *romanovi* labelled "*romanovi*; Fusio, Suisse." This specimen will be dealt with later (2c, ab. *insubrica*, Wackerzapp.).

AB. POSTOCHREA, STAUDER (37).

Under an article headed "Lepidoptera from Lower Italy," and described as *Callimorpha D. domina*, Hübner, ab. *postochrea*, Stauder describes a specimen from Faito (near Naples), taken in June, in the following words (translated): "In this specimen the small light spot on the hindwing is not yellow but red-ochre in colour."

Seitz (9), attributing the name to Staudinger incorrectly, says, "specimens with deep ochreous-yellow hindwings from the Mte. Faito." I have never seen a specimen.

In the absence of further evidence, it must be considered as an aberration of subsp. *persona*, which is known to occur near Faito. As, geographically, it is widely separated from any red hindwinged *dominula*, it may be a new mutation comparable to ab. *bieli*, Staudinger, in subsp. *lusitanica*, Staudinger, and subsp. *teberdina* in *P. rossica*.

AB. INTERMEDIA, ROCCI (32).

The *dominula* in north-west Italy in Piedmont are most complicated, and probably hold the key to all Italian *dominula*, but until more exact information is available final conclusions are impossible.

I will quote a translation of Rocci's paper:—"In Piedmont, and particularly in the hills of Turin, I have collected three forms of *dominula*. The first is:—

Typical *dominula* with the hindwings of a vivid red colour. The spots of the forewing are normal in colouring and size. The second is:—*rossica*, Kol. It has hindwings decidedly yellow. The abdomen is of the same colour, and the markings of the forewings are white, or slightly tinted a smoky yellow (*leggrissima sfumatura giallognola*). The third form is:—

Var. *intermedia*, N., which most certainly deserves this name because of its characters which place it between those of typical *dominula* and those of *rossica*. It has, in fact, hindwings of a beautiful orange-red (*oranciato*) appearance, and is the same colour as the abdomen. The degree of black on the hindwings is nearly equal in all of these forms. Typical *dominula* is most commonly met with, the *intermedia* is rather rare, and *rossica* the rarest."

He then goes on to discuss "Aberrational Forms," and the first he deals with is:—

"Ab. *italica*, which in some districts turns up as a recurring form. It can be compared with var. *rossica* by its yellow hindwings, but differs from it by having a black abdomen. It is rare, but was collected in various localities in Piedmont (Turin and Valgae)."

Rocci therefore states that in Piedmont there is a yellow hindwinged *dominula* of normal markings which is not ab. *italica* and intermediates occur which are more numerous than the yellow forms.

Oberthür states (10): "I possess, in fact, some Italian *persona* in which the red colour replaces the yellow. They come from Piemont, and were in the Bellier Collection. I have heard it said by the earlier Paris entomologists that this form (absolutely the same as the one Standfuss calls *romanovi* from a cross of red *dominula* × yellow *persona*) flies at large in the immediate vicinity of Turin. It has not then been necessary to have to resort to artificial hybridisation in laboratories in order to produce *romanovi*. This variety occurs in nature, and already the local race in Fusio seems to suggest a transition between typical *dominula* (as figured by Rosel) and *romanovi* hatching in the open and at large in the north-west of Italy."

I have in front of me these two specimens mentioned by Oberthür which are in his collection labelled "Pièmont, ex Bellier Collection." (Plate III, Fig. 1.) Also a third labelled "*romanovi*; Fusio, Suisse, R. Oberthür, 1907," and which was figured by him in "Etude de Lep. Comp.," No. 1040, Pl. CXVIII, under the name of "*dom-romanovi*." Two of these are practically identical except that the last has an extra black dot on the hindwing, and is the specimen which Cockayne points out in his paper (26) is very similar to ab. *medionigra*, Cockayne, which is found in this country.

The third (also labelled Piemont, ex Bellier Coll.) differs from the other two in having a black abdomen with small lateral red dots, and is, in fact, a "red *italica*," as Oberthür suggests.

The important thing is, however, that typical *dominula* with normal red bodies and thin black dorsal stripe, but with slight decrease of forewing markings and some increase of black markings of hindwings, occur here, and are undoubtedly what Rocci considered normal *dominula*.

Returning now to Rocci's yellow examples which occur along with *dominula* such as these, we must point out the following facts:—

- (a) These yellow forms could not really be *P. rossica*, Kol., which we know now as a separate species occurring in Russia.
- (b) He was probably referring to ab. *lutea*, Staudinger (*lutescens*, Oberthür), which was wrongly known as var. *rossica*. Cockayne suggests this in his paper. This is impossible if we are to accept the intermediates (ab. *intermedia*, Rocci) as having anything to do with them, because we now know that the heterozygotes of ab. *lutea* are indistinguishable from normal red *dominula*. There are no intermediates.
- (c) They cannot be ab. *italica* because Rocci himself points out the differences, and states that this may occur elsewhere in the district.

What, then, is the explanation of these yellow *dominula*, and ab. *intermedia*? It has already been shown that in the production of the Italian races two separate lines of mutation have taken place. Firstly, yellow replacing red of the hindwing. Secondly, melanistic factors. It would be unreasonable to assume that these arose at the same time and in the same place. Both Goldschmidt and Standfuss have shown by their experiments that this yellow does not behave like the yellow in *dominula*, ab. *lutea*. There are intermediates. There are different gene-complexes controlling them.

I believe that the most probable explanation of the Piedmont *dominula* is that we have here the Italian yellow factor, dissociated from its melanistic associates, and occurring in typical *dominula*.

As it will have to be referred to, I suggest the name of ab. **subitalica**, nov. ab.

Ab. *intermedia* then may refer to the heterozygotes of *subitalica*, and would be, as Rocci states, commoner than they are.

The fact that ab. *italica* with black abdomen actually occurs, though rarely, in the same district as stated by Rocci, would account for the records of wild *romanovi* also, and Oberthür has, in fact, one in his collection from here. Boisduval, in 1840 in "Genera and Index Methodicus," refers to a "var. A *donna*" in these words: "Alis posticis rubro-radiatis: abdomine cyaneo." Duponchel also refers to this var. A in his *Catalogue* as "Ailes inf. Rayées de Rouge. Abdomen bleu." This is before the time of any known hybridising of *dominula* and *per-*

sona in captivity, and it must be assumed he referred to wild caught or bred specimens.

Lastly, also, it will be seen (*vide infra* subsp. *pompalis*) that the primary melanistic factor of "*italica*" also occurs entirely freed from the yellow as a local race.

It has been pointed out that the pairing *dominula* × *persona* does not produce individuals with a "beautiful orange-yellow hindwing." This may certainly be correct but all observers are agreed that some of the progeny of this pairing have hindwings of a colour intermediate between red and yellow (=orange), though the majority fall towards the red of typical *dominula*.

Furthermore, Matthes (65) has shown that a pairing (*dominula* × *italica*) × *italica* produces a percentage of individuals with "orange-yellow" (orange-gelb) hindwings.

It may be, then, that ab. *intermedia* does not represent the heterozygote of *subitalica* × *dominula* but of those individuals occurring in 50% of the offspring of (*subitalica* × *dominula*) × *subitalica*, which pairing is bound to take place wherever the Italian yellow mutation comes into contact in a state of nature with typical red hindwinged *dominula*.

CONCLUSIONS ON PIEDMONT DOMINULA.

It appears then that in Piedmont the following forms of *dominula* occur:—

1. Normal red *dominula*, yellow *dominula* (ab. *subitalica*) and intermediates (ab. *intermedia*).
2. The basic melanistic factor superimposed on each of these giving:—"red *italica*," "intermediate *italica*" (*romanovi*) and *italica*, with both factors present.

Until work is done on the essential pairing which Goldschmidt omitted, namely *dominula* × ab. *italica* (=aa bb), we shall not have complete proof of the validity of the theory I have just put forward.

2B. SUBSP. POMPALIS, NITSCHÉ (41).

(Plate III, Fig. 6.)

In North-East Italy, in the Dolomites and Southern Tyrol, there occurs in the valleys a definite race of *dominula* characterised by bright carmine-red hindwings, increased black markings (as in subsp. *persona*), and of large size.

Dannehl, apparently not having heard of *pompalis*, describes at great length the same form from the same area under the name *subalpina* (synonym) in 1928 (1), stating "under which name it has appeared for some years in my lists (*in litt.*)."

He states that the black marginal spots of the hindwing are run together and often united with the spots of the costa, so that only small remnants of red are to be seen on the outer margin. He also states that on the veins of the basal area numerous fine black rays are sometimes to be seen. The forewing spots are reduced markedly. The

abdomen has the black markings so increased that "the body appears completely black."

Here, then, we have red *dominula* in which the primary melanistic factor of ab. *italica*, dissociated from the yellow, is imposed on the normal pattern. It is the counterpart of *subitalica* from North-West Italy.

This race, however, has other modifications apart from this such as increased size, brilliance of colour, etc.

If this is correct the pairing *subitalica* \times subsp. *pompalis* would produce a proportion of insects in the F2 generation indistinguishable from ab. *italica*.

Dannehl states that *pompalis* flies in the valleys of Unteres Villnös, Gröden, Eisack-, Tierser-, Eggen-, and Sarn Vales. Also Gaulschlucht in the Ulten Valley, Lower Sarca and Fleims valleys. Nitsche's specimens were from Waidbruck in the Dolomites.

Dannehl also points out that in the same area at a higher altitude typical *dominula* flies "along with its aberrations *hamelensis*, Pflum., and *bithynica*, Staudinger (=ab. *crocea*, Schultz).

"The larvae of *pompalis* feed on Sallow, *Spiraea saliciformis*, Alder and many other plants." Normal *dominula* also occur at Udine, Bozen, Trient and Ala (43).

AB. INSUBRICA, WACKERZAPP (42).

The position of *P. dominula* in the area in Switzerland south of the Simplon Pass is obscure. Wackerzapp, in 1891 in a paper on "The Fauna of the Simplon District," states that in mid July he caught, at Val Vedro, a new form of *dominula* with the ground colour of the hindwing a normal red, but the markings of the fore and hindwings and abdomen agreeing in the smallest detail with ab. *italica* described and figured by Standfuss in the second part of "Iris," and also one in his own collection. The abdomen was black with small lateral dots of red. As it was a single specimen, he was unable to conclude whether or not this was the usual form for the district.

Next we have the Oberthür specimen from Fusiö, which is identical with the Piedmont red *dominula*, with a red body and black dorsal stripe. Lastly, both Seitz and Cockayne, in referring to *insubrica*, mention "the red of the hindwing being tinged with yellow (obscure luteis)."

It appears from this, then, that *dominula* in this area are a heterogeneous lot comparable with those in Piedmont. Wackerzapp's specimen is undoubtedly a "red *italica*" because of its black abdomen. Oberthür's is without this factor, and is typical *dominula*, and the references to forms with intermediate red and yellow hindwings suggests again very strongly the same state of affairs as in Piedmont (= ab. *intermedia*). One would, therefore, expect *subitalica* and *italica* to be found also. These may not necessarily be anything but very rare aberrations, depending on the relative frequency of the yellow gene in the

population, so that if rare the intermediate (= heterozygote) only may be in evidence.

Dannehl states (1) that his *subalpina* (= *pompalis*) from South Tyrol "was formerly mistaken in distribution as *insubrica*, with which it has nothing to do." All the "*insubrica*" in the Tring Museum labelled "Meran, S. Tyrol" are in fact *pompalis*.

The genetic formula of *pompalis* may in fact be the same as Wackerzapp's original specimen, but as will be pointed out subsp. *pompalis* has other separate modifications apart from this which make it a distinct subsp. They are variances on the same genetic constitution.

CONCLUSIONS ON "AB. INSUBRICA" AND DOMINULA IN THE SIMPLON AREA.

Wackerzapp gave the name *insubrica* to the one insect in his possession from the Simplon District. This insect was a "red *italica*."

There is evidence that all the insects in this area are not of this form. They are probably a heterogeneous lot comparable with those in Piedmont. In his paper he says: "If my belief is confirmed that it is of regular occurrence, I suggest this new form be called var. *insubrica*."

It would therefore appear unreasonable to continue to give it the rank of subspecies. It should be applied to those insects found at large in Switzerland and North West Italy having red hindwings with increased black markings, black abdomen, and diminished forewing markings (= red *italica*). It should be held as an aberration.

It is not necessarily synonymous with ab. *romanovi*, Standfuss, which must always be heterozygous to the Italian yellow. It refers to typical *dominula* with the addition of the primary melanistic factor of *italica*.

To make this clear I will summarize the possible genetic formulae of each form:—

	Primary melanistic factor,	Italian yellow factor,
<i>Dominula</i>	Not present.	Not present.
ab. <i>insubrica</i>	Present.	Not present.
ab. <i>intermedia</i>	Present.	Present (hetero.).
ab. <i>subitalica</i>	Not present.	Present (homozy.).
ab. <i>italica</i>	Present.	Present.

It is of great interest if either of the Italian mutations are present in the Simplon area of Switzerland. This is north of the River Rhone, where subsp. *rhodanica* occurs and where, as far as is known, neither factor occurs, and they are thus separated from the Piedmont *dominula* by them.

It may well be, then, that these Italian mutations are of great age and that the *dominula* population of the Rhone valley (= subsp. *rhodanica*) have arisen from individuals that have come in more recently from the West from the *dominula* of southern France.

CONCLUSIONS ON ITALIAN DOMINULA.

It will therefore be seen that in southern and central Italy there exists a race of *dominula* which is the product of two separate lines of

mutation in combination, and that the melanistic factor built up on *italica* (the primary melanistic factor) is subject to considerable modification, probably as the result of allelomorphism.

In north-west Italy this yellow mutation exists separate from the melanistic factors and occurs as an aberration in normal *P. dominula*, in which the homozygotes are yellow and the heterozygotes intermediate to both.

In north-east Italy the primary melanistic mutation exists dissociated from the yellow and occurring as a subspecies (subsp. *pompalis*). Between these two areas is at least one place where both the factors (as in *italica*) occur alongside typical *dominula* so that all combinations of the complex are found.

Geographically, Italy is isolated from the rest of Europe by mountains along the whole of its northern border except in the extreme west, and here typical *dominula* occur (with slight modification) and are encroached on by one of these mutations. The same state of affairs occurs to the east, where typical *dominula* also occur in the foot-hills of the mountain ranges.

These two mutations probably occurred separately and at different times, possibly in Central Northern Italy, the yellow to the West and the melanistic mutant to the East.

If these theories are proved correct, and I think there is already considerable evidence that this is so, it will be automatically accepted that Italian *dominula* are a subspecies of *dominula* and in no way a distinct species.

3. THE RHONE VALLEY RACE: SUBSP. **rhodanica**, NOV. SUBSP.

(Plate III, Fig. 2.)

In Valais, Switzerland, along the valley of the Rhone there occurs a distinct race of red hindwinged *dominula*, characterized by the following points:—

- (a) Forewing spots have the normal white replaced by bright yellow.
- (b) Diminution in size of forewing spots.
- (c) The insects are rather smaller than normal *dominula*, frequently markedly so.
- (d) Subapical spot small in size, often "hooked" as in ab. *basinigra*, Cockayne.

This race, then, contains a heterogeneous group of small-sized *dominula*, but having the common factor of yellow-spotted forewings. In my opinion, temperature (heat) may be responsible for many of the modifications which appear. For years this race has been incorrectly referred to as subsp. *bithynica*, Staudinger, to which it has not the slightest resemblance except that they both have yellow-spotted forewings. Furthermore, it is not usual to call a race by a name which refers to a place (Bithynia) about a thousand miles distant. I suggest

the name subsp. *rhodanica* (nov. subsp.) as being the most explicit. Whether its origin is phenotypic or genotypic does not affect its position as a race.

4. SUBSP. BITHYNICA, STAUDINGER (58).

(Plate III, Fig. 7.)

Subsp. *bithynica* expressly refers to *dominula* from Bithynia, Asia Minor. These insects are well represented in the Oberthür and other collections from Brussa, and without exception are insects of very large size (up to 60 mm.) with normal-sized forewing spots of yellow (or brownish-yellow), seldom, if ever, as brilliant as in subsp. *rhodanica*. In some examples the forewing spots are slightly reduced in size, but never to so marked a degree as in Rhone Valley specimens. They include, as far as I know, the largest examples of the species, and are occurring in the most easterly limit of its range before being represented by *P. rossica*. The genitalia are indistinguishable from *P. dominula*.

Staudinger named it in "Cat. Enum. Method. Delep.," 1871, stating:—" *Bithynica dominula*, Mn., 'Wien Mts.,' 1862, p. 369 (*Al. ant. mac. omnibus totis luteis*)."

In "Wiener Entomologische Monatsschrift," VI, Mann., under a list of insects from Brussa in Asia Minor refers to *C. dominula* thus:—"The orange yellow marked larvae are to be found in April. The moth is out at the end of May, and in most instances has orange-yellow forewing spots replacing the white." Staudinger referred to these insects in naming the race *bithynica*.

CLASSIFICATION OF ABERRATIONS OF *P. DOMINULA*, L.

Synonyms: *profuga*, Goeze, 1781; *domina*, Hübner, 1801; *dominulina*, Stephens, 1829.

- A. SHOWING INCREASE OF BLACK.
- B. ABERRATIONS IN GROUND COLOUR. (a) Forewings, (b) Hindwings.
- C. INCREASE IN LIGHT MARKINGS AND DECREASE OF BLACK.

A. Showing Increase of Black.

- Ab. *paradoxa*, Reich, 1934.
- Ab. *nigra*, Spuler-Hofmann, 1906. Syn., *nigroviridis*, Thierry-Mieg.
- Ab. *basinigra*, Cockayne, 1928.
- Ab. *bimacula*, Cockayne, 1938.
- Ab. *medionigra*, Cockayne, 1928.
- Ab. *nexa*, Schultz, 1905.
- Ab. *privata* (nov. ab.).

And Increase of Black Due to Temperature:—

- Ab. *marita*, Schultz, 1905.
- Ab. *paucimacula*, Schultz, 1905.

B. Aberrations in Ground Colour.

(a) Forewings.

Ab. *crocea*, Schultz, 1900 (August). Syns.—Ab. *ochrômaculata*, Fuchs, 1900 (September); ab. *spaneyi*, Strand, 1912; ab. *bithynica*, Stgr., 1901.

Ab. *hamlensis*, Pflumer, 1879. Syn., *albimacula*, Favre, 1899.

(b) Hindwings.

Ab. *lutea*, Staudinger, 1861. Syns.—Ab. *lutescens*, Oberthür, 1911; ab. *rossica*, Standfuss, 1884; ab. *lusitanicula*, Bryk, 1937.

Ab. *brunnescens* (nov. ab.).

("Ab. *domina*," Hübner, 1801).

Ab. *diluta* (nov. ab.).

C. Increase in Light Markings and Decrease of Black.

Ab. *fasciata*, Spuler, 1910.

Ab. *conferta*, Schultz, 1905.

Ab. *flavoconferta*, Schultz.

Ab. *illustris* (nov. ab.).

Ab. *ocellata* (nov. ab.).

Ab. *conjuncta* (nov. ab.).

Ab. *juncta*, Cockayne, 1928.

Ab. *albomarginata* (nov. ab.).

Ab. *flavomarginata* (nov. ab.).

Ab. *decolorata* (nov. ab.).

Ab. *junctasuffusa* (nov. ab.).

Ab. *radiata*, Krodell, 1905.

Ab. *reichi*, Bryk, 1937.

A. SHOWING INCREASE OF BLACK.

AB. PARADOXA, REICH (34).

(Plate III, Fig. 10, and Plate II, Fig. 3.)

Seitz, in his Supplement to Vol. 2, 1932, p. 281, states that Doctor Reich had described a genuine melanic specimen with no metallic sheen. It was of normal size and the markings were entirely obscure. In "Mitt. Deuts. Ent. Ges.," v, p. 18, 1934, Doctor Paul Reich, under a heading "A New Aberration of *Callimorpha dominula*, L.," states that he had received a remarkable aberration of this species from the collection of the late Professor Hensel. It was a female and was taken on the wing at Gr. Raum near Königsberg, Prussia. He considers it unlikely to have its origin in temperature abnormality, or from pathological causes. He regards it as a true melanic. The description is as follows:

Précis: Ground colour of both wings uniformly blackish-brown with reduced sealing.

Forewings: Darkest towards the base, and from there the density of the colour is reduced towards the outer margin, which is rather

lighter. At the end of the basal cell there is a large dark discal spot. On the inner margin, near the base, is a yellow line 2 mm. in length. (This is the yellow streak normally present in *dominula*.—H.B.D.K.) Forewings otherwise completely without markings and without metallic sheen.

Hindwings: Small discal spot faintly distinguishable. Basal colour reddish, somewhat yellow diffused, otherwise the wing is without any markings. Underside similar but the reddish suffusion is extended somewhat more from the base towards the middle.

Abdomen: Black at the base, then red with thick black dorsal stripe, and black anal extremity. Sides and undersides black.

The insect is in Doctor Reich's collection.

In 1939 I obtained an insect which had been bred by Mr R. Pitman from near the river Avon, Wiltshire (Plate II, Fig. 3). It was a melanic *dominula* without metallic sheen, and was very loosely scaled. The usual pattern of the forewing can be seen with difficulty under the heavy black scaling. It darkens towards the base and the yellow streak near the base mentioned by Reich is present on one side only. The hindwing is black over its distal half, then flushed with red which increases towards the base. Body red, with broad black dorsal stripe. The thorax has, however, the usual narrow yellow streaks present in *dominula*, but they are duller and smaller than usual. I was about to give this aberration a name when Dr Reich's paper came into my possession. I am now convinced, however, that we are dealing with the same aberration.

More recently still (1942) I have seen two specimens which I believe are shortly to be described. They were bred from larvae from another part of England. In my opinion these, too, are probably *paradoxa*, though there is no trace of red on the hindwings.

The outstanding characteristics of this aberration are the lack of metallic sheen, the loose scale effect, and the reddish flush on the black hindwings, which appears to vary in extent. It is probably infertile. It must be extremely rare. All four examples appeared under natural conditions, the three present known British examples having been bred out of doors along with numbers of wild collected larvae which produced normal *dominula*. There is no evidence, then, that temperature has played a part (as in *ab. marita*, Schultz).

AB. NIGRA, SPULER-HOFMANN (43).

In this aberration the whole of the forewings, hindwings and body is black, but the insect retains the bright metallic green sheen on the forewings except in those areas in which the light spots would occur if present. It is controlled by a distinct genetic factor and is probably recessive and heavily lethal. It has no association with other melanic or melanistic *dominula*, and there is no evidence of temperature playing a part. There are no intermediates. Of the dozen or so which have ever occurred probably all come from the Deal (Kent) colony.

There is, however, one labelled "Germany, 1901. Leech collection" in the Oberthür collection. Nearly all were taken between 1880 and 1910. I extracted a cripple from a pupa which I obtained at Deal in 1936.

There are three in the British Museum besides the one in the Oberthür collection. Two are in the British Collection, one figured by Millière¹ which became Thierry-Mieg's type for his ab. *nigroviridis* (synonym) labelled "Deal, 1884." There is one in the Doubleday Collection. Spuler's type was in the Berlin Museum.

AB. BASINIGRA, COCKAYNE (26).

This aberration is characterized by the absence of basal spots of the forewing. The central spot is replaced by a horizontal yellow streak, and the subapical blotch is usually hooked. This is generally associated with some increase of black markings of the hindwings.

With the exception of C. Rippon's brood from Dry Sandford (59) (*vide infra*) all the *basinigra* I have seen (about 20) have been males. I have five extreme ones in my own collection. The genetics appear obscure. The F1 generation of a pairing, *basinigra* male \times *bimacula* female, produced all *medionigra* (no *basinigra*), with the abnormal sex ratio of 12 to 1 males to females. The F2 generation was abandoned due to my absence in 1940 on Medical Service. Of the larvae which I re-collected in 1941 from where they had been put down, I bred no *basinigra*. It appears, then, that it certainly is not a dominant. This aberration is widespread in the country from north Staffordshire to Deal.

I believe it is a distinct genetic entity although there is in series a gradation from it to ab. *paucimacula*, Schultz, which can definitely be a temperature product.

I believe these intermediates are temperature products also, and are confused with it. The name *basinigra* should therefore refer strictly to those insects which concur exactly with Cockayne's original description.

I hope soon to be able to report more fully on this. I am at present rebreeding the pairing *basinigra* male \times *bimacula* female.

AB. BIMACULA, COCKAYNE (26). AB. MEDIONIGRA, COCKAYNE (26).

(Plate II, Figs. 15 and 16.)

(Plate II, Fig. 8.)

THE DRY SANDFORD COLONY.

These two aberrations were named by Cockayne in 1928. Ab. *bimacula* is characterized by an absence of all spots of the forewings with the exception of the two basal spots, which are unaffected. Traces of marginal spots may persist. The hindwings have great increase of the dark markings which go to form a band from the costa to the anal angle. This band varies in extent, with a corresponding decrease of the normal red ground colour. Ab. *medionigra* refers to the heterozygote of ab. *bimacula*. They vary in degree from specimens with the central

spot of the forewing absent or reduced to a dot, together with an extra black spot on the hindwing, placed midway between the discal spot of the hindwing and the anal angle, to examples where the dominance of *dominula* is less complete, with the forewing markings much reduced (with the exception of the basal spots), and where the extra spot of the hindwing is extended in each direction to form a thin band from the costa to the anal angle.

The bodies in both aberrations normally retain the red ground colour of typical *dominula*.

The only locality where these aberrations are found so far is at Dry Sandford in North Berkshire.

There is a great deal more to be said about this extraordinarily interesting mutation, but I intend to touch on the fringe of it only, as I understand that E. B. Ford is about to write on this most remarkable colony at length. I should like, however, to make the following observations:—

Ab. *bimacula* is recessive to typical *dominula*.

Ab. *medionigra*, the heterozygote, is intermediate between *dominula* and *bimacula*. One can grade in series these *medionigra* via extreme heterozygotes to *bimacula* so that one merges into the other. Dominance of the type is very incomplete. This mutation is of comparatively recent origin. It appears to have increased in the last twenty years. The gene-frequency up to 1928 was 1.2. In 1939 it was 9.8; 1940, 11.1; 1941, 6.8; 1942, 5.4 (E.B.F.).

It is extremely virile, including the pairing *bimacula* \times *medionigra*. The pairing *bimacula* \times *bimacula* is less easy to obtain, but has been done on many occasions. There is no doubt in my mind that on occasions preferential pairings take place. On more than one occasion I have observed the only two specimens showing this mutation to select each other from among numbers of typical *dominula*.

I have already referred to the residual white dots on the outer margin of the forewings of *bimacula*. It would seem that their appearance is controlled quite separately from the *bimacula* gene. A pairing *bimacula* \times *bimacula* may produce individuals in which they are strongly marked. Presumably they are the result of secondary modifiers. Probably in a similar manner has arisen the extreme degree of variation in the extent of the dorsal stripe of the abdomen. In 1939 H. Newman had a strain in which in a proportion of specimens this stripe was very broad, so that the whole dorsum appeared black. Still more recently, in 1942, I have a *bimacula* from him in which the abdomen is definitely black with only small lateral red dots remaining of the usual red ground colour.

For some years, also, he has noticed the tendency for the basal spots themselves to become smaller and smaller in his *bimacula* strain, and in 1942 he produced examples in which they were reduced to mere pin-points. The origin of this is obviously quite different from C. Rippon's examples, and bears no resemblance to ab. *basinigra*.

I consider that in all probability these secondary melanistic factors have arisen as allelomorphs of the *medionigra-bimacula* gene, and are comparable in every way with the *persona-nigradonna* complex of Italian *dominula*.

The origin of the complete disappearance of the basal spots in 50% of C. Rippon's brood in 1941 is less easy to understand. From a female *medionigra* taken wild at Dry Sandford sixty imagines were bred. Of these, eighteen were type, sixteen were *medionigra*, ten var. "A" and sixteen var. "B." Var "A" refers to a form which differs from typical *dominula* in having the basal spots entirely absent, and the central spot of the forewing is replaced by a horizontal yellow streak. All the remaining spots distal to this are much reduced in size. Hindwings show some increase of normal markings. This aberration is practically indistinguishable from *basinigra*, Cockayne, and when we consider that even the type *dominula* of this brood has extra heavy hindwing markings, it will probably account for all those differences that have been pointed out. For the purpose of analysis I will refer to this var. "A" as ab. *basinigra*.

Var. "B" has the whole of the forewing black except for a few small marginal spots. The hindwing shows a merging of the discal spot with the extra spot present in *medionigra*, to form a small band. The composition then of var. "B" is *medionigra* + *basinigra* superimposed one on the other.

There are two possible explanations of this brood:—That Rippon's original female *medionigra* was heterozygous to *basinigra*, and itself paired with a homozygous recessive *basinigra* (= var. "A"). Or that var. "A" is in fact a heterozygous dominant, and was the male parent to his female *medionigra*, the homozygous dominant being unknown. In either case the original male parent must have been a var. "A."

I think the former explanation the more likely, and if we accept var. "A" as *basinigra*, Cockayne, the second explanation is untenable, for *basinigra* is not dominant to type (*vide supra*).

A further complication is added by the fact that several other examples of var. "B" have been previously bred from various strains of *medionigra-bimacula*, yet var. "A" (*basinigra*) has not so far been reported from this colony, though *basinigra*, Cockayne, may occur anywhere. One would expect it to be infinitely more common than var. "B" (the combined product).

I have in my collection two examples identical with var. "B," Rippon. The first I bred in 1939 from a pairing by Newman, *bimacula* × *medionigra*. (Plate II, Fig. 7.) It produced six *bimacula*, three *medionigra*, and one var. "B." Of these the *medionigra-bimacula* had somewhat small but normal basal spots. E. B. Ford, to whom I wrote on the matter, discussed the possibility of its origin as a double recessive *basinigra* × *medionigra*, a view I put forward. Against this is the fact that no *basinigra* (var. "A," Rippon) have been bred. In concluding, he mentions the possibility "of a mutation occurring at the

same locus as the *bimacula* gene, producing a new multiple allelomorph." It does not behave like this in Rippon's brood, however, though whether a mutation arising as an allelomorph in the first place can itself exist freed from its original gene complex is a question I leave to E. B. Ford to deal with.

Lastly, there has recently come into my possession still another aberration with melanistic tendencies from this colony. The forewings are normal with well-developed central spot, but the hindwing has a great extension of the black, so that the marginal spots are fused into a continuous band. There is a second inner band running parallel to it, commencing anteriorly at the discal spot, and running to the anal angle. This second band on its inner side has a definite tendency to ray formation towards the base. Whether this is in any way connected up with the *medionigra-bimacula* gene is impossible to tell. In many ways it resembles the description of ab. *nexa*, Schultz (*vide infra*).

In conclusion, then, it would appear that this colony is genetically in a very unstable state, that the *medionigra-bimacula* gene has increased in the population, and that other melanistic mutations have appeared possibly as allelomorphs.

It is possible that in the future the characters of the colony as a whole may be altered, as has happened in Italian *dominula*, or that eventually a balance between typical *dominula* and *bimacula* will be reached.

AB. *privata*, NOV. AB. (VIDE P. ROSSICA, AB. PRIVATA, SHEL.).

AB. *NEXA*, SCHULTZ (50).

"*Alis post. nigrofasciatis*" Schultz states:—"The black spot in the middle of the costa of the hindwing is united with the black marginal spot lying on the inner angle to form a black transverse band. Bred in the normal way. Rare among the typical form." The type is in his Collection. I have never seen a definite example of this aberration, nor can I find it figured. Rocci states:—"It is not very rare in Piedmont."

TEMPERATURE EFFECTS.

The effect of temperature on the pupae of *P. dominula* has been but little investigated under controlled conditions. Still less has anything been written up about what little has already been done. Cornell claims a multitude of aberrations, including *italica*, as the result of temperature experiments, but there is absolutely no evidence to substantiate his claim.

Generally speaking, the effect of heat on a *dominula* pupae is to increase the extent of the black markings. C. Rippon in 1941 noted that pupae of a brood of *dominula medionigra* which were forced at a high temperature produced individuals uniformly more extreme than those, in the same brood, which were left to outdoor temperatures.

At higher temperatures one of the earliest effects is a splitting of the upper basal spot into two. Still further, the upper half above the vein disappears altogether and, lastly, the whole spot may disintegrate. It is my belief that many of the insects intermediate to *ab. basinigra*, Cockayne, are produced in this way.

Excluding Rippon's brood (*vide supra*), there is no evidence as yet that even *basinigra* itself does not have its origin this way.

AB. PAUCIMACULA, SCHULTZ (39).

This can undoubtedly be produced by temperature effect, particularly heat. In extreme forms the forewing is without marking except for the spot at the inner angle. Hindwing with increased black, particularly at outer angle. I have accidentally bred extreme *paucimacula* from pupae which were subjected to strong sun heat. They showed no inclination to pair. Staudinger states that he has bred *paucimacula* under normal conditions (49). It is possible, therefore, that it may occur genotypically as well.

AB. MARITA, SCHULTZ (50).

"Forewing unicolorous without spots. Transitions to *ab. marita* show the spots of the forewing indistinctly but strongly sooted. Obtained experimentally." (Exposure of pupae to cold.) Unfortunately, there appears no mention in literature as to the state of the hindwings.

B. ABERRATIONS IN GROUND COLOUR.

(a) Forewing.

AB. CROCEA, SCHULTZ, 1900 (AUGUST).

There has been, and still is, a great deal of confusion about "yellow-spotted *dominula*" occurring as an aberration. At various times it has been the fashion to refer to them as *ab. bithynica*, *ab. spaneyi*, or *ab. ochromaculata*, etc., quite neglecting place of origin or priority of name.

In 1900, both Schultz and Fuchs named a yellow-spotted *dominula* occurring sporadically as an aberration among normal *dominula*. Mr F. Griffin has been good enough to ascertain the dates of publication of these two names. His conclusions are that Schultz's *crocea* (52) came out in "Illust. Z. Ent." at the end of July or the beginning of August, whilst Fuchs' *ochromaculata* (51) in "Jahrb. Nassau. Ver. für Naturk." was received at the British Museum on the 18th of October and "that the publication date was some period shortly before October." It therefore appears, in the absence of further evidence, that *ab. crocea*, Schultz, has precedence over *ab. ochromaculata*, Fuchs. *Ab. crocea*, Schultz, referred to a specimen taken at Mähren.

Fuchs, who describes his specimen from Newiges, near Eberfeld, at great length, states that it is an aberration with the normal white spots of the forewing replaced by yellow-ochre (ockergelben).

Still later, in 1912, Strand describes (53) in detail a specimen presented to the Royal Zoological Museum, Berlin, by A. Spaney, which

was taken at Schwäbisch Gmünd, Württemberg, and in which the normal white markings are replaced by yellow. He named it *spaneyi*. He obviously had not heard of *crocea*, still less *ochromaculata*, as he compares it with ab. *bieli*, "but in this the hindwing also differs in colour."

Lastly, *bithynica*, Staudinger, has been used to refer to these aberrations with yellow-spotted forewings which occur sporadically throughout the range of *dominula*. This name must be reserved for the good subspecies *bithynica* occurring in Asia Minor (*vide supra*). Ab. *crocea* occurs occasionally in this country in most colonies of *dominula*. Newmān has bred it from North Berkshire. It is probably recessive to the type although the proportion in his F2 generation was unsatisfactory. Standfuss considered it a temperature product and figured one (5) which is referred to by Strand in describing *spaneyi*.

There is a specimen in the Doubleday Collection in the British Museum having the left side extreme ab. *crocea* and the right side with normal markings. It is a female without any data. It goes to prove the likelihood of genotypic origin. Its appearance would be explained in this case by a binucleate ovum.

I believe there is a possibility of two genetically distinct aberrations occurring in this country with yellow-spotted forewings: ab. *crocea*, in which all the spots of the forewings are of normal size and uniformly yellow, and another in which this yellow is most marked in the subapical group of spots, which are elongated. This yellow may spread proximally, but to a lesser degree, to the remainder of the forewing spots.

Until the necessary breeding has been done on these, the question must remain unanswered.

AB. HAMALENSIS, PFLUMER (54).

"Forewing spots all white."

I am not yet satisfied that a *dominula* occurs which, when freshly emerged, is of normal appearance, but with all the spots of the forewing white.

I am equally certain that the majority of "*hamalensis*" so labelled in collections are in fact normal *dominula* which have been exposed to the sun and weather. The yellow of the basal spot seems to fade rapidly under certain conditions, even though the rest of the insect appears fresh and in good condition. I have bred one specimen, however, with the basal cell spot of a very pale yellow.

In the summer of 1941, while visiting the Deal colony, I noticed a large number of what appeared to be *hamalensis* sitting about exposed on the undergrowth. The same year I had bred a good many hundred *dominula* from the same colony and had produced no *hamalensis*.

Reich bred from specimens taken in northern Spain (Treviso, Picos de Europa) having all the forewing spots white (ab. *hamalensis*), and produced nothing but normal *dominula* (55).

Staudinger points out (27) that in subsp. *lusitanica* examples are caught in the wild state having all the forewing spots white; when bred, however, the basal and central spots were yellow. This in no way disproves the existence of *hamalensis* controlled entirely by a genetic factor, but this may be very rare and does not detract from my opening observation that the majority of *hamalensis* in collections are, in my opinion, weathered *dominula*.

(b) *Hindwings*.

AB. LUTEA, STAUDINGER (60).

(Plate I, Figs. 10 and 11.)

NOMENCLATURE.

The confusion which exists in naming "yellow hindwinged *dominula*" even surpasses that found in "yellow-spotted *dominula*."

So far in this paper we have clearly defined the following with yellow hindwings:—

Panaxia rossica, Kol.

Panaxia dominula, subsp. *lusitanica*.

Panaxia dominula, subsp. *persona* (along with ab. *italica*, ab. *nigradonna* and subsp. *majellica*).

Panaxia dominula, ab. *subitalica*.

We are now left with a *dominula* with yellow hindwings which occurs as an aberration sporadically throughout the range of the species.

This was quite clearly named by Staudinger in 1861 ab. *lutea*. Nevertheless, it was usually referred to as ab. *rossica*, started by Standfuss, and continued up to recent times. In 1911, Oberthür, despairing, named it *lutescens*, and ignored the name *lutea* altogether. Seitz, in 1910, makes the incredible statement that "*lusitanica*" occurs "singly in South Germany." He too had not heard of *lutea*. Bryk, noting Seitz's statement, and ever ready to name, gave birth to the phantom wonder "*lusitanicula*" (from Darmstadt). Why a perfectly simple aberration, with no intermediates to complicate things, should give rise to such confusion I find hard to explain, but the fact remains that it must be one of the most named insects in Europe.

DISTRIBUTION.

Ab. *lutea*, as already stated, is widespread throughout the species. Engramelle, when he saw it, thought he was having his "leg pulled," and wrote about "a little trick with sulphurous vapour, to catch the ignorant and make them pay dearly for it." The fact that the source of supply was a colony on the outskirts of Paris, in which it occurred fairly frequently, does not speak well for his opinion of Paris Entomologists.

In this country the headquarters of this aberration is the Deal colony, where towards the end of the 19th Century quite a few were collected or bred from wild larvae. In 1897 Levett obtained three

("Entom.," xxx, 20) and Sabine two. In 1906 C. P. Pickett took one, and in the same year L. W. Newman bred a female which was to become the original parent for the hundreds he bred in the next twenty-five years.

This mutation seems to be very much rarer in this colony of recent years, the only record since Newman's female in 1906 being one bred by the late Mr Russell James in 1929.

In the last ten years, at a conservative estimate, I must have bred some 5000 imagines from Deal, and have visited the colony when the imagines were plentiful, yet I have never seen *ab. lutea* alive. This is in accordance with the usual habits of aberrations which do not apparently either benefit or deter their existence in the normal population. Due to a few chance pairings of heterozygotes, the proportion of homozygous forms is temporarily increased but may rapidly fall to its normal level. This is obviously more likely when the numbers in the locality fluctuate from time to time, so that the colony is repopulated from comparatively few individuals.

I have examined the data of all the *lutea* I have seen, and I have come across four labelled "Ringwood, J. H. Fowler" in 1896 and 1897 (61). This is the only other colony, so far as I know, where this aberration occurs in this country. It is significant that they occurred here at the same time as the Deal ones, and before this time it was not being bred in a pure state by Newman, or anyone else. *Dominula* appears very local at Ringwood, but it is hard to believe that in view of these records *ab. lutea* might not occur anywhere on the Avon.

GENETICS.

In 1906 L. W. Newman paired his original *lutea* female with a typical red *dominula* male. The F1 generation produced normal red *dominula*; there were no intermediates. The F2 generation produced 25% *ab. lutea* (1:2:1). In spite of what Mr Newman said at the time, it is obvious that *lutea* \times *lutea* was fertile and bred true as a recessive, producing 100% *lutea*.

E. B. Ford has discussed the chemistry of the pigment of *lutea* along with other yellow winged Lepidoptera (56).

AB. *brunnescens*, NOV. AB.

(Plate II, Fig. 9.)

Forewings: Normal markings. The basal cell spot and central spot are of very deep orange. On the left side of my type the central spot is split into two by the vein.

Hindwings: Normal black markings, but the whole of the ground colour with the exception of a narrow strip on the costa is an olive-brown, faintly tinged with pink. Between the discal spot and the anal angle this colour is somewhat accentuated by a smoky area, and in some examples this area alone is involved. Along the costa there is a narrow strip of wing with the normal red

colour which runs distally as far as the outer angle. Abdomen bright red as in typical *dominula*, standing in contrast to the colour of the hindwings.

Type ♀ in my Collection, ex larva, Deal, 1940. Bred outdoors in normal temperature.

There is a specimen of *dominula* with the normal red colour of the hindwings replaced by brown figured by Barrett (Fig. 1b, Plate 70, Vol. 2, "Lep. of the British Isles"). It is from the Sidney Webb Collection. This is also ab. *brunnescens*.

I have several other examples in my Collection bred from Deal in which the red colour of the hindwing is brownish with a greater or lesser degree of suffusion. The smoky area in the middle of the hindwing is often well marked, and there may be an extra black spot in the centre of this. I have bred from one of these a ♂ in 1938, and the F1 generation produced five *dominula* with normal red hindwings; one, however, had the small smoky patch previously described. The F2 generation perished, the larvae having advanced too far to hibernate.

I consider my type an extreme example of ab. *brunnescens* which may cover a variety of intermediate forms, but in all the hindwings have a diminution of red colour, a smoky patch in the centre of the hindwings, with a normal red abdomen. There is no proof as yet that these intermediates may not turn out to be separate entities.

It would be foolish to speculate at this stage whether temperature plays a part, or whether the origin is purely genotypic. All my examples were bred out of doors in normal conditions (*vide infra* ab. *domina*).

"AB. DOMINA," HÜBNER (62).

The name "*domina*" has quite incorrectly been used for referring to brown hindwinged *dominula* (=ab. *brunnescens*).

The position seems to have arisen thus:—Hübner, in error, referred to "*dominula*" as "*domina*." He omitted the letters "ul." His figuring of *dominula* was hand painted, and white lead was incorporated with the red to give the correct appearance of the hindwing. In the passage of time this white lead has been turned into lead sulphide, a dark-coloured compound, so that his "*domina*" hindwing is now composed of a red and black mixture giving a brown hindwing. Luckily, this theory is borne out by a copy of Hübner's ("Europa Schmett.") in the Tring Museum, in which his figure still retains its normal red colour of the hindwing, the central spot of the forewing is missing (it is referable to ab. *privata*, *vide infra*), the remaining spots are normal but slightly reduced. Staudinger was obviously puzzled by it, and described it "al. post. nigris, basi maculis luteis, abdomine nigra," and came to the conclusion, incorrectly, that it must be a *persona*.

I have not seen Godart's figure (57) of brown hindwinged *dominula*. This was twenty-one years later than Hübner's and may possibly duplicate the same error. Barrett's figure most certainly is correct, as in

Fig. 1 of his same Plate he showed a typical *dominula* with bright red hindwings.

AB. *diluta*, NOV. AB.

(Plate II, Fig. 4.)

Forewings: All spots much reduced in size. Basal cell spot small with tendency to "splitting." Central spot present as small horizontal streak. Subapical blotch represented by a thin vertical streak, hooked internally at its costal end as in ab. *basinigra*, Cockayne. The apical group is represented by two small dots.

Hindwings: Ground colour a clear pale pink, intermediate between red and yellow. Black markings normal in position but heavy; in particular the discal spot at its lower end is hooked internally as in some cases of ab. *paucimacula*. Abdomen red.

Type in my Collection. Bred ex larva, Deal, 1937, under normal conditions.

I can offer no explanation as to its origin.

C. INCREASE OF LIGHT MARKINGS AND DECREASE OF BLACK.

AB. *FASCIATA*, SPULERHOFMANN (43).

Spuler states "Sometimes the light spots on the marginal cells seem to run together to form a steep transverse band and the small spots at the apex may run parallel and the hinder spots of this may run into the above mentioned band, the black spots of the hindwing strongly reduced; ab. *fasciata* (with bands)."

Seitz states "Ab. *fasciata*, Spuler. The spots on the forewing merge together in pairs to form transverse bands." And in the Supplement to Vol. 2 figures an aberration, which is in the Munich Museum, with the remark that "it is a very fine ab. coming between *conferta* and *fasciata*."

Cockayne follows Seitz's description, saying "Spots on forewings confluent in pairs transversely" (26).

From this it would appear that there is a divergence of views as to what exactly *fasciata* is.

It must be noted that Spuler in his description refers to the outer spots of the forewings only, and the reduced hindwing markings. No mention is made as to the ground colour of the hindwings, which must be assumed to be normal red.

AB. *CONFERTA*, SCHULTZ (50).

AB. *FLAVOCONFERTA*.

Schultz, in naming *conferta*, states:—"Al. ant. maculis confluentis. The yellowish and white spots respectively found on the costa of the forewing are run together with the spots below on the inner margin, to make large, light transverse spots."

Both Seitz and Cockayne state:—"All spots on forewings confluent."

I have not found the description of *flavoconferta* mentioned by Reich (47).

It will be noted that no mention is made as regards ground colour or markings of hindwings, but Reich, in comparing a form of *P. rossica* with *dominula*, ab. *conferta*, says that the black markings of the hindwings were replaced by yellow.

AB. *illustris*, NOV. AB.

(Plate II, Figs. 1 and 2.)

Ground colour of forewings ink-blue.

In my type (Plate II, Fig. 1) the basal spots are separate and of normal size, but with somewhat irregular outline. In my paratype (Fig. 2) they are large, confluent and pale. The central spot in each is very large, being separated from the basal cell spot by a narrow line of ground colour. The subapical blotch merges indistinguishably into the greatly enlarged apical group of spots to form "fingers" continuous with this blotch. The large spot at the inner angle merges with this area so that it, the subapical blotch, and the greatly enlarged apical spots form a large irregular area of white, edged with yellow in its periphery where it approximates to the ground colour. In my type the spot at the inner angle throws a tongue of white internally towards the lower basal spot.

Hindwings: Ground colour a soft tomato pink. All normal black markings replaced by golden-yellow with the exception of the discal spot, which in my type is black edged with yellow. In my paratype this also is all yellow with the exception of a small central black dot.

Fringe black, with the exception of a small break opposite the yellow anal spot, where it is gold. Abdomen red.

Type and paratype in my Collection, ex larvae, Hampshire and Berkshire respectively, 1938. They are both females.

I paired both these females with typical males. It has been one of my greatest entomological tragedies that I had an extremely high mortality rate amongst my hibernating larvae in the winter of 1938, through reasons which could now be avoided. I lost 100% of one brood, and of my other only on one occasion did I have a ♂ and ♀ out together. These paired and in due course (in 1940) produced sixty or seventy normal *dominula*. These were paired up *inter se* and produced only normal *dominula*. Assuming that the always possible error was not committed in my one pairing of the F1 generation (and extremely rigid precautions are always taken in keeping my broods absolutely distinct), the explanation of the origin of *illustris* must be complex, depending on more than one factor, possibly three. It is highly unlikely that temperature played a part. On the other hand, the error may have occurred which can happen in the best controlled experiments.

OBSERVATIONS ON AB. FASCIATA, AB. CONFERTA, AND AB. ILLUSTRIS.

This group constitutes the most difficult problems. In the first place, the original descriptions of *fasciata* and *conferta* are insufficient to be able to visualize clearly the whole insect.

There appears to be a continuous series of *dominula* commencing with those with the black markings of the hindwings partially replaced by yellow whilst retaining the normal red ground colour (as in W. H. Harwood's example in the British Museum labelled "Newbury, 1906"), to examples with all the hindwing markings entirely replaced by yellow on a normal red ground colour, and with normal forewings, but with slight increase of apical markings such as I have recently seen in N. T. Easton's most interesting broods, in which they appeared in no obvious genetic ratio.

The series passes through *fasciata* (as described by Spuler), of which my figure on Plate III, Fig. 5, may be a modification, to *conferta* in which we know the white and yellow spots of the forewings are coalesced, and in which we do not know the state of the hindwings. My *illustris* shows one feature which none of these appear to have, namely, the beautiful soft pink of the hindwing ground colour. It is for this reason I consider it may be distinct, and in order to be able to refer to it I have decided to give it a name. I think I am correct in saying that the only other undoubted example of *illustris* which has been taken in this country is the exquisite insect in the Tring Museum, which is figured in the "Entomologist," 1883, p. 1, and is labelled "Caught St Margaret's Bay, near Dover, July 6th, 1882." In this specimen the hindwings are identical with those of my paratype to the smallest detail, but the forewings are even more extreme, with the whole of the marking confluent, together forming a central white and yellow cloud surrounded with a narrow rim of ground colour along the outer boundaries of the wing.

Fasciata, *conferta* and *illustris* are exceedingly rare. They may be genetically distinct, but on comparing the three known specimens of *illustris* (my own two and the Tring Museum's), and seeing the very great variation within these, it is not unlikely that both *fasciata* and *conferta* are expressions of the same gene complex, modified by secondary factors. Seitz's figure, "intermediate between *conferta* and *fasciata*," bears many features common to my *illustris* and upholds this view.

Until we have figures of type *fasciata* and *conferta*, and until we have exhausted their possibilities by breeding them, it is useless to conjecture further on these individual insects.

AB. *ocellata*, NOV. AB.

(Plate II, Fig. 5.)

Forewings: The normal white markings are minutely bordered with yellow scales. The anal spot is pointed internally.

Hindwings: Very pale red. All black markings ringed with yellow.

Type in my Collection. Bred 1940, ex wild larva, Hampshire.

Until I saw Dr Haynes' series recently, I had not attached any significance to this insect. However, he has bred four from the same area as mine, two of which are more extreme. In particular, the anal spot of the forewing, which in mine is represented by a point, in his throws a tongue of white (and yellow) as far as the basal spot, comparable with the state of affairs in Fig. 1 of my *-illustris*. I have no doubt that it is a genetic entity, though whether they, too, are part of the *fasciata*, *conferta* and *illustris* complex it is impossible to say.

AB. **conjuncta**, NOV. AB.

(Plate II, Fig. 12.)

Forewings: Ground colour ink-blue. The basal spot of the discoidal cell and the central spot of the forewings are fused into one as in ab. *juncta*, Cockayne. It is a pale primrose-yellow. This fusion is continued distally as a thin line running parallel with the costa, which joins the subapical blotch and which appears hooked internally where this line meets it. On the left side the subapical blotch is itself continued into the upper pair of apical spots, so that there is, in fact, continuity of pattern from the basal cell spot to the apicals.

Hindwings: Pale pink. Black markings, normal size but dull.

Type, ♂ in my Collection. Ex larva, Hants, 1938. It died shortly after drying its wings, so no pairing was possible.

It is significant that it hatched from the same batch of wild larvae which produced my type *illustris* in 1938.

There is an identical specimen in the Tring Museum (♀) bred by Cornell, labelled "Temperature experiments." There is absolutely no evidence that temperature was the cause of it or even played a part; it is most unlikely that it did in mine.

AB. **JUNCTA**, COCKAYNE (26).

(Plate II, Fig. 6.)

The basal spot of the discoidal cell and the central spot of the forewings are fused together to a "dumb-bell"-shaped spot. Colour and all other markings of both wings as in typical *dominula*. Intermediates do not occur, particularly on the underside.

Recurring aberration in certain localities, particularly at Deal and on the Avon. Genetics not yet worked out.

AB. **albomarginata**, NOV. AB.

(Plate II, Fig. 13.)

AB. **flavomarginata**, NOV. AB.

(Plate II, Fig. 14.)

Forewings: In both, the apical group of spots are greatly enlarged and striated. They fuse together, particularly the lower two, to form a large white band which is edged distally by the black fringe. There may also be an extra white spot beneath this between the apical fusion and the anal spot. This is present in my type of *albomarginata*.

Hindwings: Bright red with somewhat reduced black markings with no inclination to form yellow rings.

Ab. *flavomarginata* has the same markings in deep yellow as in ab. *crocea*, Schultz, and I believe this yellow is frequently linked with this form.

Type *albomarginata* ♀ in my Collection. Ex wild larva, Hants, 1938.

Type *flavomarginata* ♀ in my Collection. L. W. Newman, Kent, 1934.

Albomarginata may be a dominant. A pairing, *albomarginata* ♀ × typical *dominula* ♂, produced one insect, *albomarginata*, due to the heavy mortality rate I had in the winter of 1938, as already stated. The normal ♂ parent was subsequently proved by the other pairings it had served not to be heterozygous to *albomarginata*.

AB. **decolorata**, NOV. AB.

(Plate II, Fig. 11.)

Forewings: The normal markings can be seen as through ground glass.

The ground colour is itself pale, so that differentiation between it and the markings is indistinct, and where they abut orange scales add to the blurring of the pattern.

Hindwings: Ground colour an extremely light crimson, quite unlike the normal red ground colour. Normal black markings replaced by creamy-brown. Abdomen red as in hindwings.

Type ♀ in my Collection. Bred A. Pitman, ex larva, Wiltshire, 1938.

This insect appears to have some pigment deficiency, and looks like a partial albino. Unfortunately, it is crippled.

C. de Worms, in 1940, bred a ♂ from the same area, which in my opinion is a less extreme example of the same aberration (66).

AB. **junctasuffusa**, NOV. AB.

(Plate II, Fig. 10.)

The specimen is asymmetrical.

Forewings: The basal spot of the discoidal cell and the central spot of the forewings on both wings are fused as in *juncta* and *conjuncta*.

The other basal spot is merged in a suffusion of yellow scales which entirely obliterate the dark ground colour surrounding it, and which extends as far distally as the anal angle spot and the lower end of the subapical blotch. On the right forewing there is a yellow streak which is continued from the "*juncta*" mark and runs into the subapical blotch parallel to the costa. Both subapical and apical spots, and to a lesser degree the spots at the anal angle, are, on this side, suffused with golden-yellow, particularly on the borders of these markings.

Hindwings: Ground colour orange red. Right side has normal black markings. Left side has these markings practically obliterated by the superimposition of yellow scales.

Type in Dr Cockayne's Collection, labelled "Wicken Fen, F. Norgate, 1896."

AB. RADIATA, KRODEL (38).

There are two white streaks at the base of the forewing on the under-side. I have not seen an example of this.

AB. REICHI, BRYK. (7).

Reich states:—"From a number of larvae which I found at Finkenkrug, near Berlin, I bred some normal *dominula* which, however, have not the abdomen all red but handsomely ringed in black and red. The dorsal stripe is retained. This effect, I wish to particularly stress, is not the result of some accidental effect during preparation. Since I have not found this variation in the many collections I have so far examined, either in yellow or red specimens, I should be very thankful for any report which may be sent to me from entomologists on similar observations."

II. CLASSIFICATION OF *P. ROSSICA*, *KOLENATI*, AND SUBSPECIES.

1. *P. rossica*, Kol. (44), 1846.
2. *P. rossica*, subsp. *teberdina*, Scheljuzhko.
Ab. flavoteberdina, nov. ab.
Ab. rubroteberdina, nov. ab.
Ab. swanetica, Reich.
Ab. privata, Scheljuzhko.
Ab. paucimacula, Scheljuzhko.
Ab. persona, Spuler.
3. *P. rossica*, subsp. *persica*, Le Cerf.

1. *P. ROSSICA*, *KOLENATI*: DISTRIBUTION.

Kolenati in 1846 states, "occurrit tantum in Russia et Transcaucasia." Typical yellow hindwinged *P. rossica* occur:—In Grusie (I. Mlokosienitch), Lagodechi (Romanoff), throughout most of the Caucasus (45). In the north Caucasus: Kislovodsk, Pjatigorsk. Dagestan: Transcaucasus-Suchum-Kale (Abchasien), Abas-Tuman, Bakuriani, Mitarba near Borzhom (Grusien), Adzhi-Kent (southwards of Jelisaved-pol). Spuler (43) adds also the Urals, Lower Volga, and Livonia. Further south still it occurs in Armenia. Eastwards from here in Persia the one example of "Var. *persica*," Le Cerf (46), has been recorded from Serdab-e-Bala, Ghilan, North Persia, which is undoubtedly a ♂ *P. rossica* with dark red hindwings as in *dominula*.

Spuler also states (43) that "*rossica*" occurs as far west as Pontus in the high mountain of the Tokat (Turkey) "as a variety." This, of course, is impossible, and the situation here is most likely one of two things: Either red and yellow *P. rossica* occur together, the red being unrecognized as *rossica*, or these examples with yellow hindwings referred to "as a variety" are actually *ab. lutea* of *P. dominula*, which occurs throughout the range of this species.

(For description of *P. rossica* see commencement of paper.)

2. SUBSP. *TEBERDINA*, SCHELJUZHKO (45), 1934

(Plate I, Figs. 8 and 9.)

In a paper in 1934 Scheljuzhko says "until quite recently it would have been generally accepted that the normal form of *Callimorpha dominula*, L., is replaced by subsp. *rossica*, Kol., in the whole of the Caucasus." He points out that he has material from many different places in the Caucasus, and that yellow hindwinged *rossica* is the rule. He goes on to say that in 1933 he collected in Teberda in the north Caucasus, and that he found an entirely different race of *P. rossica*. This race occurred all over the Teberda district, in the Teberda and Dzhemegat Valleys, at an elevation of 1300-1600 metres, also, further away, the hills by the river Muchu, Kunatschvi Gorge, and Chatipara Mount, at an elevation of 1800-2000 metres.

The moths were not uncommon where they occurred, flying in damp sunny places near to where shrubs grew, from July 22nd (probably earlier) to August 25th.

Scheljuzhko obtained ova from females taken in copula and fed the larvae on nettle and these hibernated in "a half-grown condition."

He states the following points of distinction about subsp. *teberdina* :—

- (a) The hindwing may be either pale red or yellow as in *rossica*, or any intermediate between them.
- (b) Only 12% of the race have the yellow hindwing of *rossica*. Pale red examples are rare, too; predominant forms are orange-red (intermediates).
- (c) The colour of the abdomen always follows the colour of the hindwings.
- (d) Subsp. *teberdina* has all the differences which characterize *rossica* except that the white spots of the forewings are proportionately larger and whiter. They are yellowish on the underside, however.

There are a series of this race in the Tring Museum from Scheljuzhko's collection. They undoubtedly represent a polymorphous race, even the yellow ones being distinguishable from normal *rossica* because of the smaller size and whiter forewing spots, as will be seen in the figures.

The genitalia of both sexes identical with *P. rossica*.

Scheljuzhko states that he takes as his type for subsp. *teberdina* the commonest form, the intermediate orange-red. He then goes on to say "only the yellow specimens must retain the name *rossica*. Nevertheless, this is to be treated, not as a subspecies, but as a form of subsp. *teberdina*."

Subsp. *teberdina*, ab. *rossica*, cannot, of course, stand, as the name is clearly occupied by the species. Conversely, it would be unreasonable to treat *teberdina* (the orange-red ones) as an aberration of *P. rossica*, as both yellow and red together constitute a good race.

I think the best way out is to refer to yellow *teberdina* as ab. *flavoteberdina*, nov. ab. (Plate I, Fig. 8), and the pale red ones as ab. *rubroteberdina*, nov. ab. (Plate I, Fig. 9).

I am very much against the unnecessary naming of insects, but complications may be avoided when we come to work out the genetics if these distinctions are made clear now. . . . Otherwise there may exist a similar medley as we found in Italian *dominula*.

It appears, then, that in the Teberda region of the North Caucasus, at a height of about 1300 metres, there exists a mountain race of *P. rossica*. This subspecies is comparable in many ways with subsp. *lusi-tanica* of *P. dominula* in Portugal. In each there is a natural balance of yellows and reds, with the majority intermediate and heterozygous to both colours.

AB. SWANETICA, REICH. (47), 1935.

Reich states that his remarkable specimen of *rossica* was taken at Swanetien at a height of 3000 metres (the snow line in the Caucasus is over 3000 metres). He had originally considered this insect an "accidental ab. of *rossica*." However, having read Scheljuzhko's paper and received three specimens of subsp. *teberdina* with which he could compare it, he was convinced that this was not the case.

A second specimen from Swanetien has been recorded by Romanoff (48), in 1884, as a *dominula* distinct from *rossica*, no doubt because of its reddish-coloured hindwings. Scheljuzhko claims that this is probably referable to his subsp. *teberdina*. Reich, however, thinks that it is not, and that both this specimen and his belong to another mountain race which he named subsp. *swanetica*. It must here be noted that Teberda is separated from Swanetien by the Kluchor Pass, and that Reich had not seen Romanoff's specimen. Reich goes on to compare these two races with the two mountain races of *Parnassius apollo* occurring in adjoining ranges.

I will give Reich's description of his specimen:—"Forewings have metallic green shimmer of *rossica*. The spots are very large and dull white, which on the underside show no yellow, as distinct from subsp. *teberdina*. The two cell spots, and the two spots situated on the costa above the outer angle are run together in a remarkable way." Reich compares this to *dominula*, ab. *conferta*, Schultz. "Hindwings dull orange, with the yellow spots replacing the normal black discal spot, and of the usual large size. Yellowish splashes are also to be seen on the outer margin as well as the anal angle. This yellow stands in marked contrast to the orange-red ground colour ('as in *bieli*') of the wing."

It seems to me that as Reich had not seen Romanoff's specimen from Swanetien, in which there is no suggestion of it being in the least degree like the one just described, it is unreasonable to assume a new subspecies differing from subsp. *teberdina*. Reich's specimen savours very much as an aberration, and not as a recurring form, but, as Reich states, "we must await future captures and observations to show if a constant race is represented."

AB. PRIVATA, SCHELJUZHKO (45).

Refers to those specimens of subsp. *teberdina* in which the terminal cell spot of the forewing (the central spot) is entirely absent or reduced to a pinpoint. Scheljuzhko states he has four in his series from Teberda which are extreme, and five with this spot much reduced. There are no other differences except this.

An exactly similar aberration occurs in this country in *P. dominula*, and it appears to me to be of no significance and unworthy of a name. However, the fact that Scheljuzhko has named it *P. rossica* seems to force the issue, and I suggest the name *dominula*, ab. *privata*, nov. ab., is given to it as a parallel aberration. I have previously referred to this form (*in litt.*) as "*pseudomedionigra*" as I consider its chief merit is its false likeness to the heterozygote of *dominula*, ab. *bimacula*, with which it has absolutely nothing to do.

AB. PAUCIMACULA, SCHELJUZHKO (45).

Scheljuzhko has a ♀ in which the two discoidal cell spots and the spot lying beneath are strongly reduced. The remaining spots are unaffected. He considers it as "a transitional to ab. *paucimacula*." There is no evidence as yet that temperature produced this form.

AB. PERSONA, SPULER (43).

(Plate III, Fig. 8).

Spuler states "aberrations are also found with the black of the hindwing extended as in *persona* (ab. *persona-rossica*)."

I figure just such an example from the Joicey Collection labelled "Armenia," in which the greatly enlarged discal spot of the hindwing joins the black markings of the anal angle to form a band. All forewing markings greatly reduced.

3. *P. ROSSICA*, SUBSP. *PERSICA*, LE CERF (46).

(Plate III, Fig. 3.)

I consider this insect, of which so far there appears to have been only one taken, of fundamental importance. It seems to have been very much overlooked. It was taken at Serdab-e-Bala in the Ghilan Mountains in North Persia on 23.vii.1903, at a height of 900 metres, and hence it is some distance from other known localities of *rossica*. It is now in the Paris Museum ("Ex Mission, J. de Morgan").

Under the name of "*Callimorpha dominula*, L., var. *persica*," Le Cerf gives a most minute description of it, and also includes a coloured figure which I reproduce.

In coming to the conclusion that "this form gives the impression, by all its characters and special appearance, as being a different species to *C. dominula*," Le Cerf points out the following differences:—The forewings are longer and less rounded. The arrangement of the white spots which are all white is more oblique than in *C. dominula*, the

presence on the hindwing of an extra black spot of large size commencing at the costa. The ground colour is red as in *dominula*.

He mentions many other differences, most of which are, in my opinion, within the normal limits of variation of this family, such as size of individual forewing spots.

It would appear from the foregoing remarks that Le Cerf did not associate this insect with *rossica*, for all the differences quoted by him are in fact, with the exception of the dark red hindwing, common to *P. rossica*.

We have here, without a doubt, a true red *rossica* which in no way bears resemblance to the reddest subsp. *teberdina*.

It may prove to be the original prototype of *P. rossica*, its better-known yellow mutant having spread north through its present known range.

I am hoping to get further material from E. P. Wiltshire in the near future, who has been collecting in this area, but who tells me that so far he has not come across this species. I suspect it may have a range east of Persia until it meets the almost unknown species *P. phillipsi*, Bartel, another red hindwinged Panaxid, of which only one specimen is so far known. It was taken at Kusch on the north-west borders of Afghanistan, some 500 miles east of the Ghilan Mountains.

Seitz says about it: "The moth is said to resemble *quadripunctaria*, but according to the author the white bands of the forewing consist of spots recalling the markings of *dominula*, and the black spots of the hindwings are much enlarged. Kusch. Russian Turkmenia (?). Unknown to me (aberration of another species)." In his supplement to Vol. 2, Seitz figured an insect with distinct transverse white bands across the wings. It has the appearance of a distinct species.

Note: Le Cerf's original description is in "Bull. Soc. Nat. Ent. de France" (40) in 1912.

CONCLUSIONS ON *P. ROSSICA* AND SUBSPECIES.

P. rossica is a distinct species from *P. dominula*, though parallel mutations seem to have taken place in both species. In the greater part of its present known range the species has yellow hindwings.

There is at least one mountain subspecies isolated in the valleys of the Caucasus in which this yellow of the hindwing may be replaced by orange-red, never as red as in *P. dominula*.

It would appear that in North Persia there exists a race with the hindwings as red as in *P. dominula*, but with the normal markings of *P. rossica*.

In conclusion I wish to thank the following for their help:—

Mr W. H. T. Tams of the British Museum, South Kensington, for his kindness in putting material at my disposal and for his preparations of genitalia and photographing same, along with his plates for *P. rossica* underside, *dominula* larvae, etc.

Mr H. B. Williams, who has been working on *P. dominula* with me, for giving me access to his notes, translations, etc.

Dr E. A. Cockayne who has also worked with me on this species.

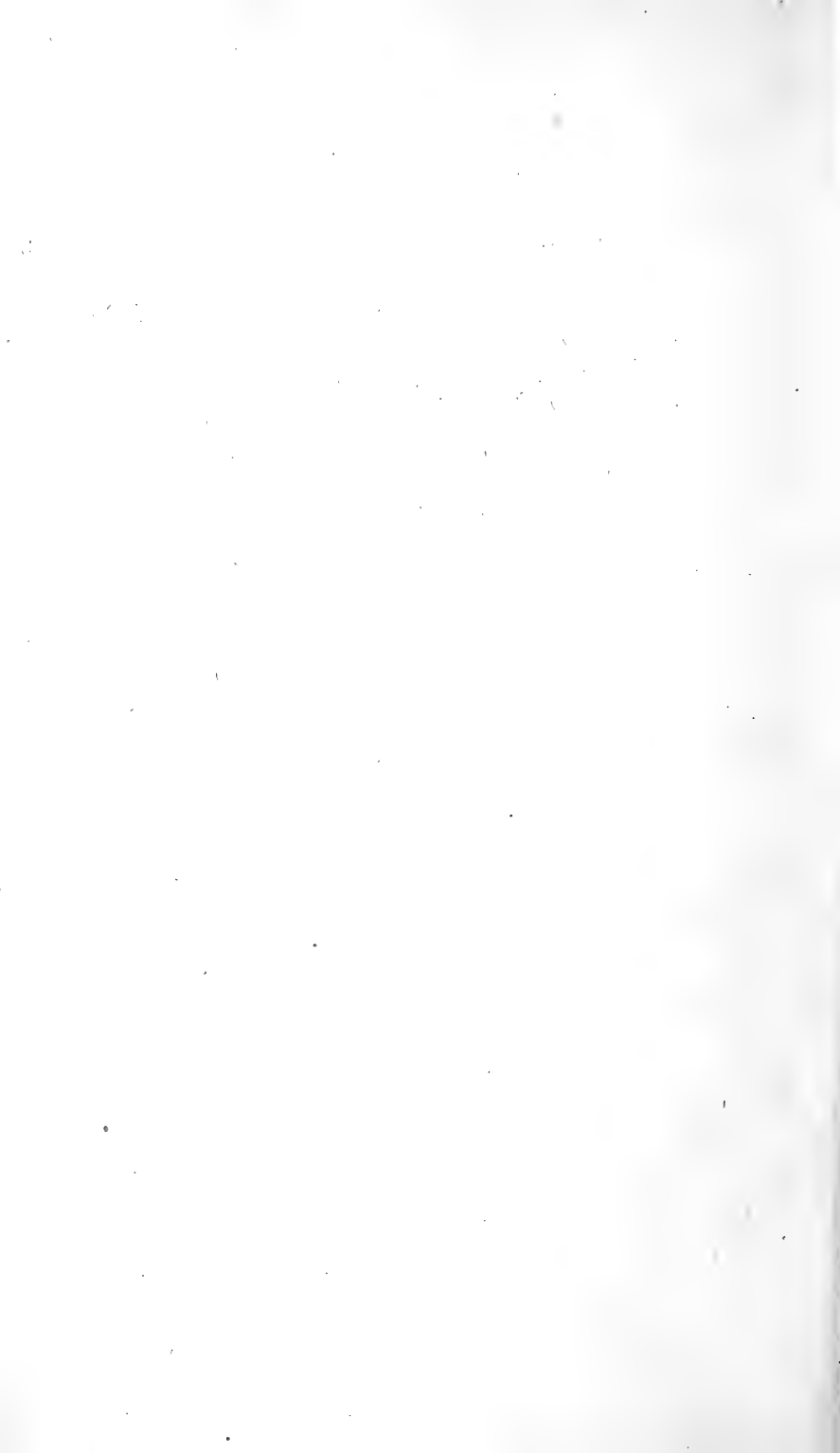
Mr J. T. Wattison for his series of subsp. *lusitanica* from Portugal for dissection.

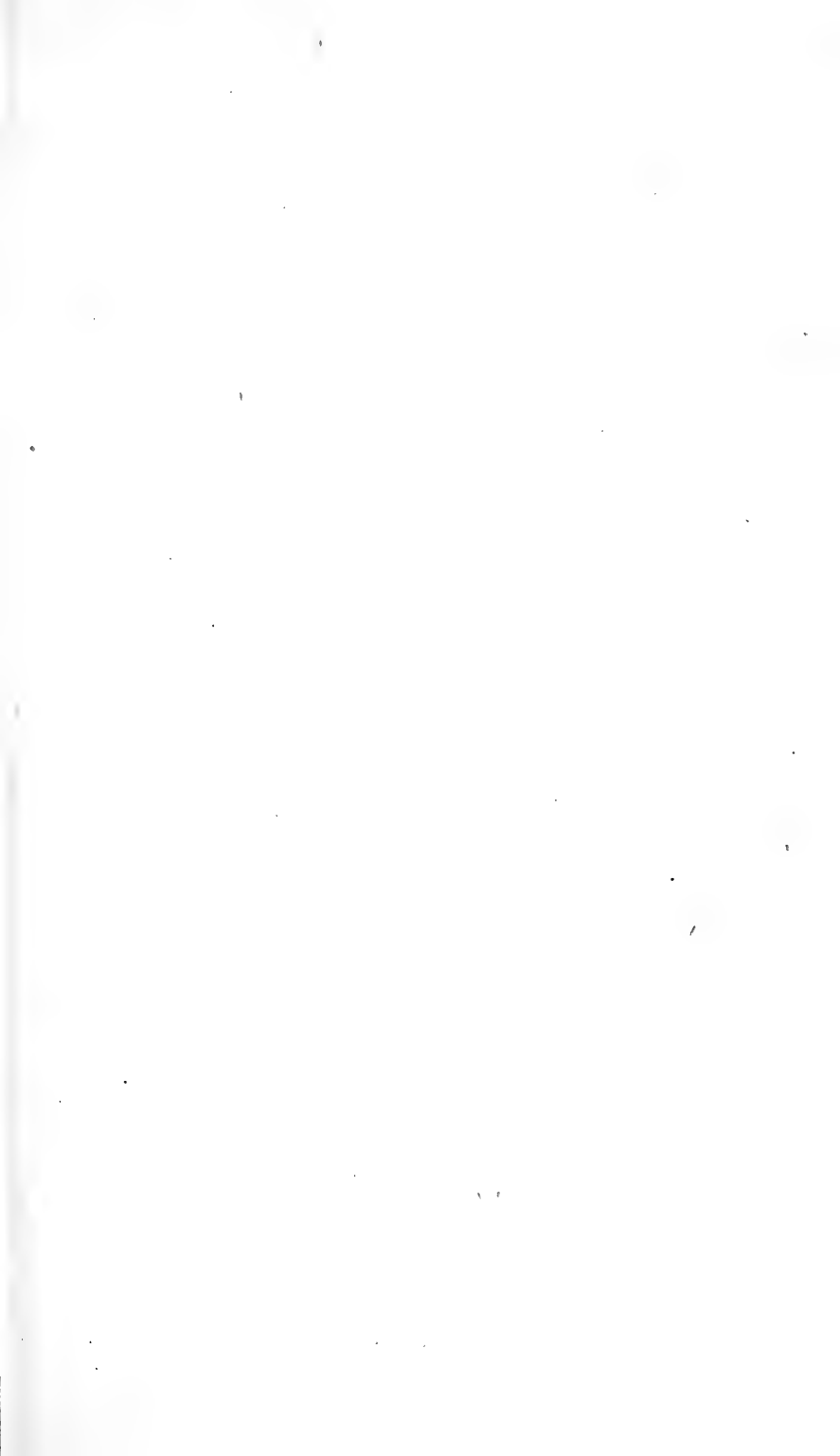
Also Mr Siviter Smith, who is responsible for the coloured plates, and has produced such a high standard of work by his four-colour process, and Mr J. Evershed for the original photographs of Plate III.

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63. "Entom. Rec.," xxv, 8, 1913.
64. W. H. T. Tams. "Entomologist," Vol. lxxii, 1939, pp. 66-74 and pp. 133-141.
65. M. Matthes. "Int. Ent. Zeit.," Vol. vii, pp. 1-2, 1913.
66. C. de Worms. "Entomologist," 73, 1940, p. 212.

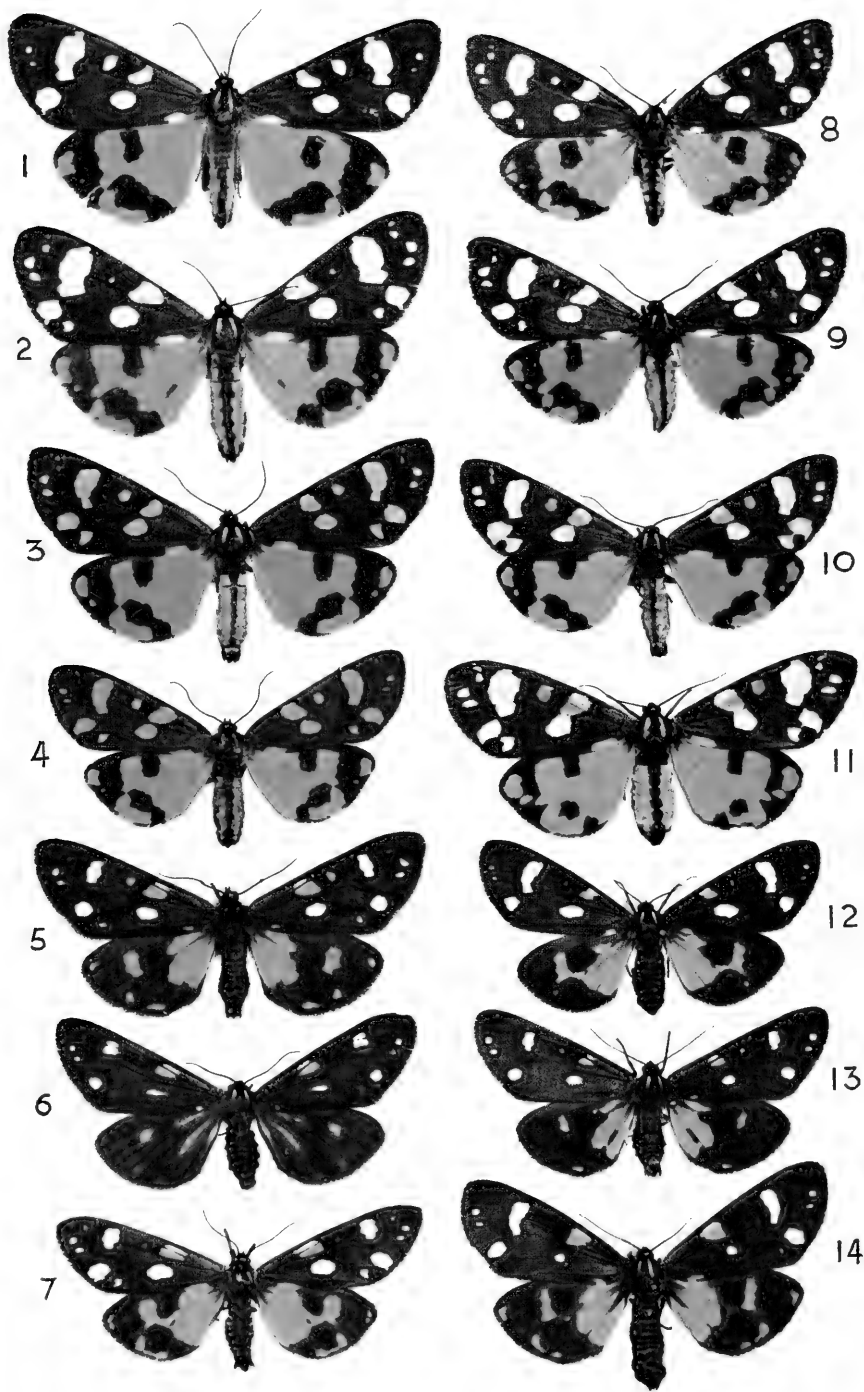




LEGEND FOR PLATE I.

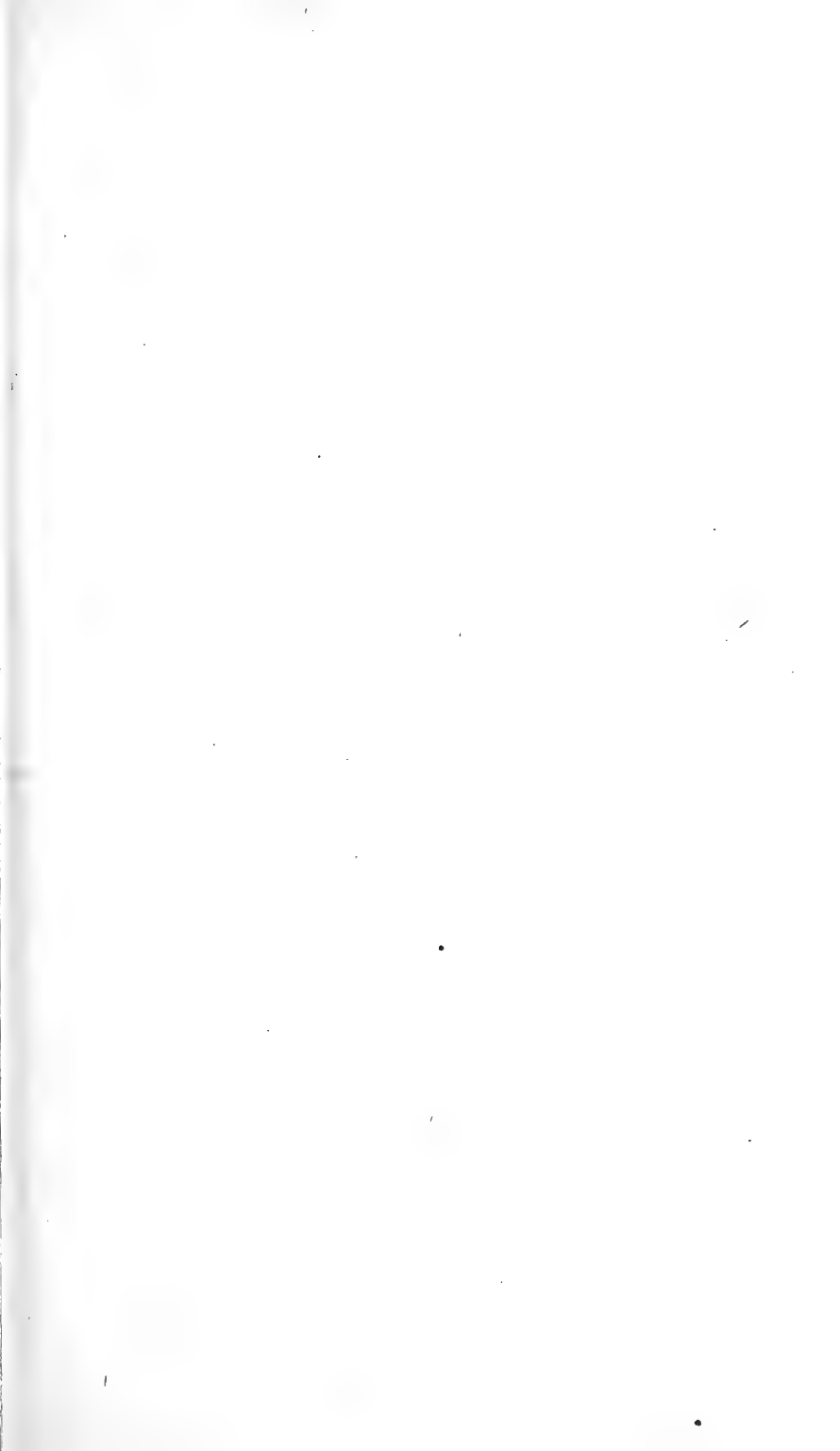
The Oberthür Collection and the Joicey Collection are in the British Museum.

- Fig. 1. *Panaxia rossica*, Kol., ex Oberthür Collection.
Labelled "*Dominula-rossica*, Lagodachi. ex Romanoff."
This is the same insect figured by Oberthür in "*Lepid. Compar.*," Vol. vi, Pl. cxviii, No. 1038. The extra black spot on the hindwing cannot be seen on the upper surface. It is present on the underside.
- Fig. 2. *Panaxia rossica*, Kol., ex Oberthür Collection.
Labelled "*Ex Musaeo Boisduval*."
The extra black mark on the costa can just be seen. Well developed on the underside.
- Fig. 3. *Panaxia dominula*, subsp. *lusitanica*, ab. *bieli*, ex Joicey Coll.
Labelled "*Oporto, Portugal*."
This is not an extreme example.
- Fig. 4. *Panaxia dominula*, subsp. *lusitanica*, Staudinger, in Tring Museum.
Labelled "*Portugal, ex Groum-Grachimailo Coll.*"
- Fig. 5. *Panaxia dominula*, subsp. *persona*, Hübner, ex Oberthür coll.
Labelled "*Toscane, 1885, Stgr.*"
This is the same insect figured by Oberthür in "*Lepid. Compar.*," Pl. cxvii, Vol. vi, No. 1032. Genetic formula probably "*Aa bb*" Goldschmidt.
- Fig. 6. *Panaxia dominula*, subsp. *persona*, ab. *nigradonna*, ex Oberthür Coll.
Labelled "*Italie Vallombrosa, ex Verity, Juin 1907.*"
Identical insect figured by Oberthür in "*Lepid. Compar.*," Vol. vi, Pl. cxvii, No. 1034. Genetic formula probably "*AA Bb*" Goldschmidt.
- Fig. 7. *Panaxia dominula*, subsp. *persona*, ab. *italica*, Standfuss, ex Oberthür Coll.
Labelled "*Italie Vallombrosa, ex Verity, Juin 1907.*"
Figured by Oberthür in "*Lepid. Compar.*," Vol. vi, Pl. cxvii, 1030. Genetic formula probably "*aa bb*" Goldschmidt.
- Fig. 8. *Panaxia rossica*, subsp. *teberdina*, Shel., ab. *flavoteberdina*, in Tring Museum.
Labelled "*Teberda (Cauc.), 27.vii.1933, P. Sheljuzhko.*"
- Fig. 9. *Panaxia rossica*, subsp. *teberdina*, Shel., ab. *rubroteberdina*, Tring Museum.
Labelled "*Teberda (Cauc.), 26.vii.1933, P. Sheljuzhko.*"
- Fig. 10. *Panaxia dominula*, ab. *lutea*, Staudinger, ex Oberthür Collection.
Labelled "*Paris.*"
Identical insect figured by Oberthür in "*Lepid. Compar.*," Vol. vi, Pl. cxviii, No. 1036, as "*dominula-lutescens.*"
- Fig. 11. *Panaxia dominula*, ab. *lutea*, Staudinger, in my collection.
Bred ex L. W. Newman, Deal, Kent.
- Fig. 12. *Panaxia dominula*, subsp. *majellica*, Dannehl, in Tring Museum.
Labelled "*Italie, Majella a Zucht., v, 1931.*"
- Fig. 13. *Panaxia dominula*, subsp. *persona*, ex Oberthür Collection.
Labelled "*Tuscany.*"
Genetic formula probably "*AA bb*" Goldschmidt.
- Fig. 14. *Panaxia dominula*, ab. *romanovi*, Standfuss, "*Yellow romanovi 2,*" ex Oberthür Collection.
Labelled "*Ex Schiller Furth, 1913, Hybrid romanovi-italica.*"



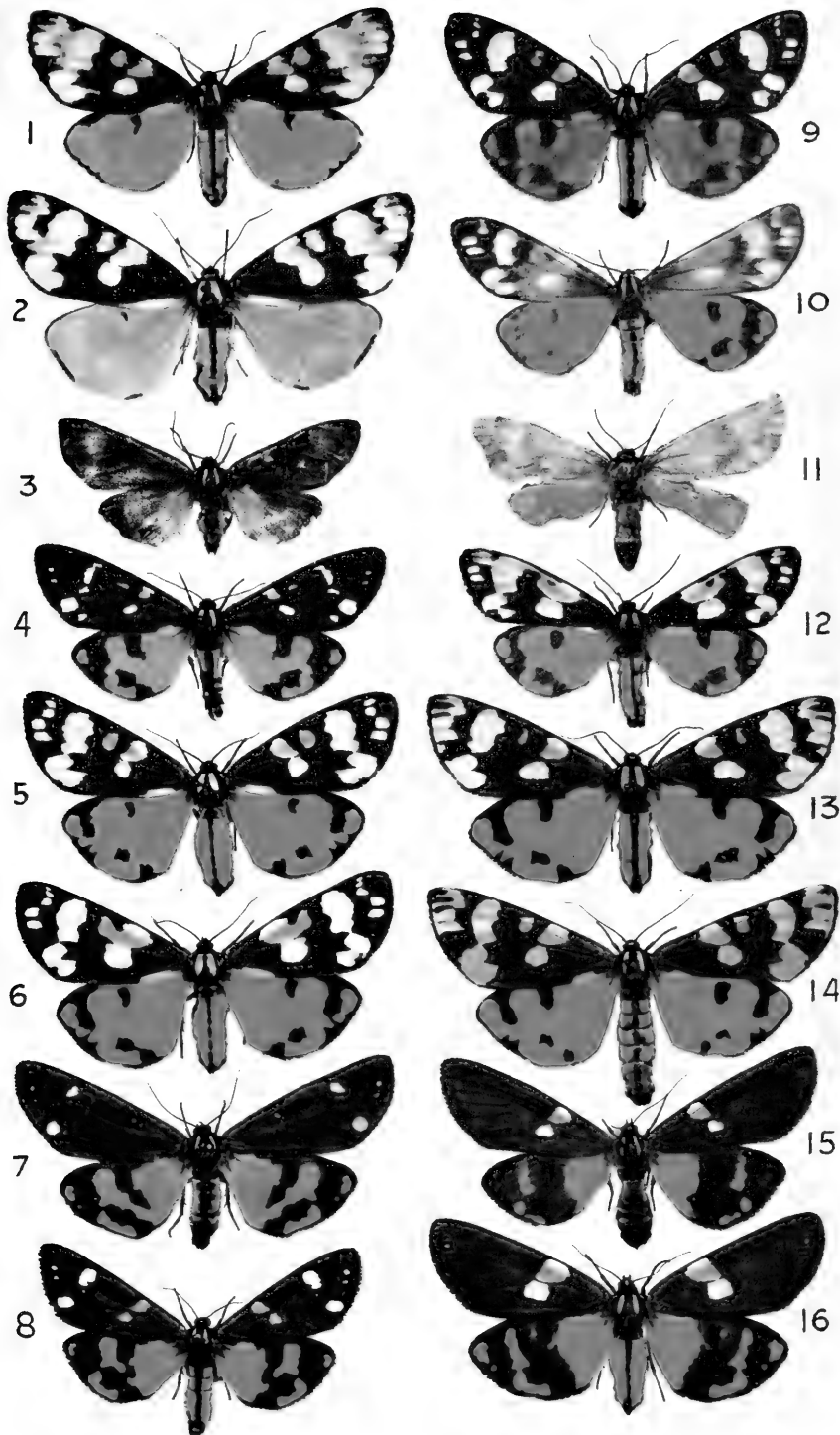
Actual size.

CLASSIFICATION OF "YELLOW HINDWINGED *DOMINULA*."



LEGEND FOR PLATE II.

- Fig. 1. *Panaxia dominula*, ab. *illustris*. In my collection.
Labelled "Bred ex larva, Hampshire, 1938." TYPE.
- Fig. 2. *Panaxia dominula*, ab. *illustris*. In my collection.
Labelled "Bred ex larva, Berkshire, 1938." PARATYPE.
- Fig. 3. *Panaxia dominula*, ab. *paradoxa*, Reich. In my collection.
Labelled "Bred ex larva, R. Pitman, 1939."
- Fig. 4. *Panaxia dominula*, ab. *diluta*. In my collection.
Labelled "Bred ex larva, Deal, 1937." TYPE.
- Fig. 5. *Panaxia dominula*, ab. *ocellata*. In my collection.
Labelled "Bred ex larva, Hampshire, 1940." TYPE.
- Fig. 6. *Panaxia dominula*, ab. *juncta*, Cockayne. In my collection.
Labelled "Bred ex larva, Salisbury, 1940."
- Fig. 7. *Panaxia dominula*, "Var. B. Rippon." In my collection.
Labelled "Bred ex ova, L. W. Newman, *bimacula* \times *medionigra*, 1939."
- Fig. 8. *Panaxia dominula*, ab. *medionigra*, Cockayne. In my collection.
Labelled "Bred ex ova, *bimacula* \times *medionigra*, 1939."
This is a fairly extreme example of *medionigra*.
- Fig. 9. *Panaxia dominula*, ab. *brunnescens*. In my collection.
Labelled "Bred ex larva, Deal, 1940." TYPE.
- Fig. 10. *Panaxia dominula*, ab. *junctasuffusa*. In Dr Cockayne Collection.
Labelled "Wicken Fen, F. Norgate, 1896. B. S. Harwood Coll. Stevens
Sale 15319." TYPE.
- Fig. 11. *Panaxia dominula*, ab. *decolorata*. In my collection.
Labelled "Bred ex larva, R. Pitman, Wiltshire, 1939." TYPE.
- Fig. 12. *Panaxia dominula*, ab. *conjuncta*. In my collection.
Labelled "Bred ex larva, Hampshire, 1938." TYPE.
- Fig. 13. *Panaxia dominula*, ab. *albomarginata*. In my collection.
Labelled "Bred ex larva, Hampshire, 1938." TYPE.
- Fig. 14. *Panaxia dominula*, ab. *flavomarginata*. In my collection.
Labelled "Bred ex larva, L. W. Newman, vii.1934, Kent." TYPE.
- Fig. 15. *Panaxia dominula*, ab. *bimacula*, Cockayne. In my collection.
Labelled "Bred ex ova, *bimacula* \times *bimacula*, L. W. Newman, 1940."
- Fig. 16. *Panaxia dominula*, ab. *bimacula*, Cockayne. In my collection.
Labelled "Bred from wild larva, Dry Sandford, vii.1938."
Showing difference in colour of abdomen from fig. 15.

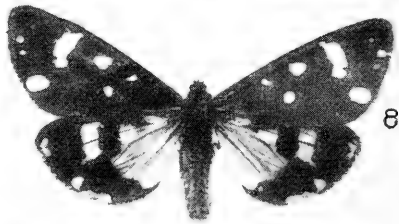
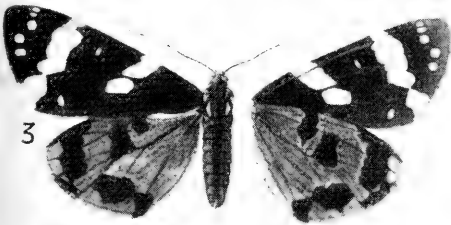


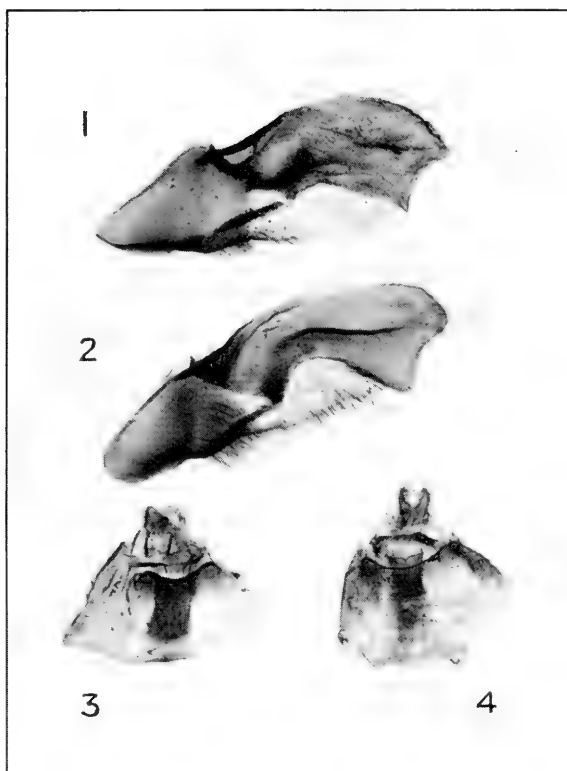
Actual size.



LEGEND FOR PLATE III.

- Fig. 1. *Panaxia dominula*. Normal red body and red hindwings. Labelled "Piemont, ex Bellier Coll." In Oberthür Collection.
- Fig. 2. *Panaxia dominula*, subsp. *rhodanica*. Forewing spots all golden-yellow. Labelled "Valais, 1900."
- Fig. 3. *Panaxia rossica*, Kol. Forewing spots all white. Hindwings red. Well marked extra black spot on costa more marked on the underside. From Serdab-e-bala, North Persia. Figured by Le Cerf in "Annales D'Histoire Naturelle," 1913, Vol. 2, p. 82. In Paris Museum.
- Fig. 4. *Panaxia rossica*, Kol. Underside showing the presence of the extra black mark on the costa of the hindwing. It is not as well developed as usual. For comparison with *P. dominula* underside opposite. (Fig. 9.)
- Fig. 5. *Panaxia dominula* aberration. Forewing markings running in bands transversely. They are edged in yellow. Hindwings red with diminished black markings. ? ab. *fasciata*, Spuler. Labelled "Paris, Bellier Coll."
- Fig. 6. *Panaxia dominula*, subsp. *pompalis*, Nitsche. Forewings glossy green. Hindwings bright red. Labelled "Meran, South Tyrol." The abdomen (missing) was black. Tring Museum.
- Fig. 7. *Panaxia dominula*, subsp. *bithynica*, Staudinger. Forewing spots all yellowish. Labelled "Broussa, Asia Minor, 1882." For comparison with subsp. *rhodanica* opposite. (Fig. 2.)
- Fig. 8. *Panaxia rossica*, ab. *persona*, Spuler. Tring Museum. Forewing spots much reduced. Hindwing with greatly increased black markings. Labelled "Armenia, ex H. J. Elwes Coll., 1920." In Joicey Collection.
- Fig. 9. *Panaxia dominula*, L. Normal underside. For comparison with *P. rossica* underside opposite. (Fig. 4.) Kettle. Coll.
- Fig. 10. *Panaxia dominula*, ab. *paradoxa*, Reich. Forewings sooty black. Lighter areas due to scale defects. Hindwings blackish with yellow-red suffusion towards base. Type specimen figured by Reich in "Mitt. Deuts. Ent. Ges.," 5, p. 18, 1934. From Gr. Raum, E. Prussia. Reich Coll.

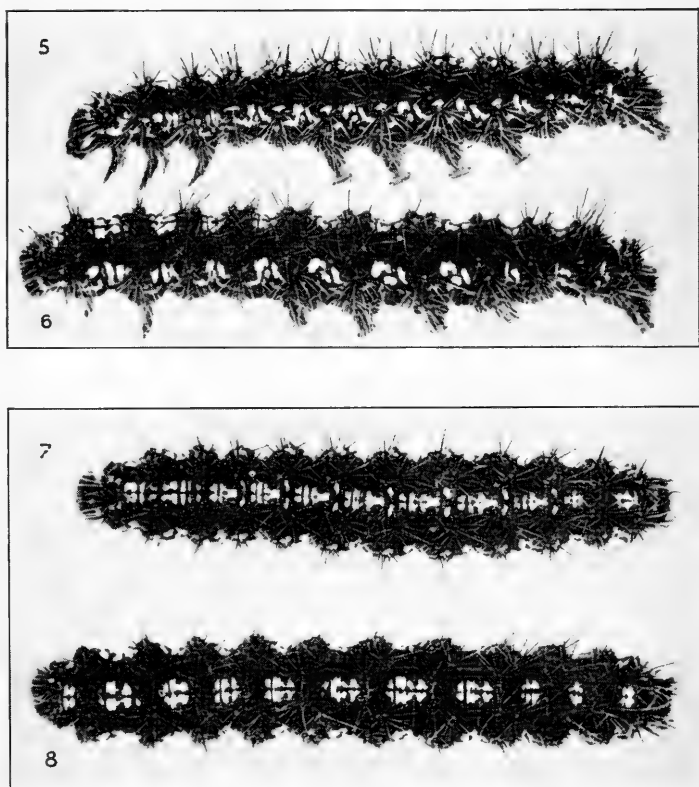




LEGEND FOR PLATE IV.

- Fig. 1. Genitalia of male *Panaxia rossica*, Kol. (male clasp). Grusie.
Fig. 2. Genitalia of male *Panaxia dominula*, L. (male clasp). England.
Fig. 3. Genitalia of female *Panaxia rossica*. From Karabach.
Fig. 4. Genitalia of female *Panaxia dominula*. England.

1-2 approx. $\times 14$; 3-4 approx. $\times 5$.



LEGEND FOR PLATE IVA.

- Fig. 5. Lateral view of Form "B." With extra white markings.
Fig. 6. Lateral view of Form "A." With diminished number of markings.
Fig. 7. Dorsal view of Form "B." Showing extra white markings.
Fig. 8. Dorsal view of Form "A." Showing absence of markings.

All $\times 3$.



PROCEEDINGS AND TRANSACTIONS
OF
THE SOUTH LONDON
Entomological and Natural History
Society

1942-43

PART II.

WITH 2 PLATES

PUBLISHED AT THE SOCIETY'S ROOMS
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OCTOBER 31, 1943.

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1943

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1936	AUGUST, V. E., 59, Hillcross Avenue, Morden, Surrey. <i>ent.</i>
1939	BAKER, D. B., F.R.E.S., 17, Florence Park, Bristol, 6, Glos. <i>l, c.</i> <i>A.F.</i>
1937	BALLINGER, D. E., "The Cottage," Canham Road, Acton, Lon- don, W.3. <i>l, A.F.</i>

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- 1896 BARNETT, T. L., 31, Littleheath Road, Selsdon, Surrey. *l*
- 1933 BAYNES, Capt. E. S. A., F.R.E.S., "Monkshatch Cottage," Comp-ton, near Guildford, Surrey. *l.*
- 1943 BECHER, Lt.-Col. L. E., "Newstead," Charterhouse Road, Godal-ming, Surrey.
- 1938 BEIRNE, B. P., PH.D., F.R.E.S., F.L.S., 4, Tobernea Terrace, Monks-town, Co. Dublin, Eire. *micro-l.*
- 1929 BELL, J. H., Dudswell Rise, Northchurch, Berkhamsted, Herts.
- 1942 BELL, Lieut. P. J., B.A., F.L.S., Dudswell Rise, Berkhamsted, Herts. *ent. A.F.*
- 1911 BLAIR, K. G., D.S.C., F.R.E.S., *Council*, 11, Durrington Park Road, Wimbledon, London, S.W.20. *n, c.*
- 1942 BLEST, T., "Homestead," Higham Lane, Tonbridge, Kent. *l.*
- 1926 BLISS, A., 4, Monahan Avenue, Purley, Surrey. *l.*
- 1941 BLOOD, B. N., L.R.C.S.I., 25, Spencer Gardens, Eltham, London, S.E.9. *hym.*
- 1925 BLYTH, S. F. P., "Cleeveland," Chislehurst, Kent. *l.*
- 1934 BORRER, C. D., "The Old Manor House," Cley-next-Sea, Norfolk. *ent.*
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- 1933 BRETT, G. A., B.S.C., A.R.C.S., D.I.C., Seale-Hayne Agricultural College, Newton Abbot, S. Devon. *ent.*
- 1935 BRETT, Mrs KATHLEEN S. L. F., Torridge, 22, Keyberry Road, Newton Abbot, S. Devon. *biology.*
- 1940 BRITTEN, H., M.M., F.R.H.S., F.INST.P.A., *Council*, "Newholme," 21, Toller's Lane, Old Coulsdon, Surrey. *ent (Chalcididae).*
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- 1909 BUCKSTONE, A. A. W., 90, Pan's Way, Kingston Road, Ewell, Surrey. *l.*
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- 1936 CHARTRES, S. A., F.R.E.S., 9, King's Drive, Eastbourne, Sussex. *ent.*
- 1922 CHEESEMAM, C. J., 26, Lyndhurst Road, Birkdale, Southport, Lancs. *l.*
- 1936 CLASSEY, E. W., F.R.E.S., R.A.M.C., 117, Sutton Lane, Hounslow, Mdx. *l. A.F.*
- 1943 COATES, R. J., 6 Malvern Road, Surbiton, Surrey. *l.*
- 1915 COCKAYNE, E. A., D.M., F.R.C.P., F.R.E.S., "Merstone," Tring, Herts. *l.*
- 1934 COLE, G. A., M.A., F.C.A., Ronkswood Hospital, Newtown Road, Worcester. *l.*
- 1935 COLLINS, R. J., F.R.E.S., "Appledore," Mugswell, Chipstead, Surrey. *l.*
- 1899 COLTHRUP, C. W., "Dehra Doon," Tite Hill, Englefield Green, Surrey. *l, oo, orn.*
- 1938 CONDER, G. M., M.R.C.S., L.R.C.P., L.D.S., 33, Grove Avenue, Sutton, Surrey. *l. A.F.*
- 1936 COOPER, B. A., B.S.C., A.R.C.S., Dept. of Agriculture, The University, Leeds, 2. *ent. (Life Member.)*
- 1907 COOTE, F. D., F.R.E.S., *Council*, 32, Wickham Avenue, Cheam, Surrey *l, b.*
- 1923 CORK, C. H., 11, Redesdale Street, Chelsea, London, S.W.3. *l.*
- 1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, London, S.E.18. *l, c.*
- 1922 COUCHMAN, L. E., c/o Mrs A. Couchman, 82, Newbury Road, Bromley, Kent. *l.*
- 1909 COULSON, F. J., "Burnigill," 24, Springfield Avenue, Merton Park, London, S.W.20. *c, hem.*
- 1918 COURT, T. H., "Oakleigh," Market Rasen, Lincoln.
- 1943 COUSINS, ROBERT J., A.C.P., M.R.S.T., F.Z.S., "Lane End," Westmill, Buntingford, Herts. *mo, c.*
- 1937 CRABTREE, B. H., F.R.E.S., "Highfield," Alderley Edge, Cheshire. *l.*
- 1935 CRASKE, E. S., "Hillsboro," Gringer Hill, Maidenhead, Berks. *l.*
- 1934 CRASKE, J. C. B., F.R.E.S., 33, Hinchley Drive, Hinchley Wood, Esher, Surrey. *l.*
- 1937 CRASKE, Major R. M., 211 Battery, 111 Field Regt., R.A., M.E.F. *ent. A.F.*

YEAR OF
ELECTION.

- 1918 CRAUFURD, CLIFFORD, "Denny," Bishops Stortford, Herts. *l*.
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, Northwich, Cheshire. *l*.
- 1920 CROCKER, Capt. W., 55, Townley Road, Bexleyheath, Kent. *l*.
- 1932 CROW, P. N., "Heathcote," Bigfrith, Cookham Dean, Berkshire. *l*. *A.F.*
- 1937 CURTIS, A. E., "The Cottage," Ifold Estate, Loxwood, Billingshurst, Sussex. *l*.
- 1927 DANBY, G. C., "Sheringham," 31, Albion Road, Sutton, Surrey. *l*.
- 1938 DAVIES, O. C., 33, Hopton Road, Streatham, London, S.W.16. *l*. *A.F.*
- 1940 DAVIS, G. A., 76, Station Road, Chingford, London, E.4. *c*. *A.F.*
- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l*, *c*.
- 1938 DEAL, JAMES, 18, Manor Road, West Wickham, Kent. *l*.
- 1933 DEMUTH, Lieut. R. P., R.N.V.R., Manor Farm, Compton Greenfield, near Bristol, Gloucester. *l*. *A.F.*
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, London, S.W.1. *l*, *mi*, *b*, *nat. phot.*
- 1930 DENVIL, H. G., 4, Warwick Road, Coulsdon, Surrey. *l*, *c*. *A.F.*
- 1901 DODS, A. W., 35, The Mall, Southgate, London, N.14. *l*.
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading, Berks. *l*.
- 1939 DOUBLEDAY, B. S., F.R.E.S., Monks Risborough, Aylesbury, Bucks. *Chalcidoidea*.
- 1936 DOUDNEY, S. P., "Thurne," 110, Foxley Lane, Purley, Surrey. *l*.
- 1930 DUDBRIDGE, B. J., B.A., Colonial Administrative Service, Tanganyika, c/o The Secretariat, Dar-es-Salaam; and 13, Church Lane, Merton Park, London, S.W.19. *ent*.
- 1927 EAGLES, T. R., *Hon. Treasurer*, 32, Abbey Road, Enfield, Middlesex. *l*, *c*.
- 1943 EASTMURE, D. F., "Granta," 43, Muswell Road, Muswell Hill, London, N.10. *l*.
- 1937 EASTON, N. T., D.F.H., 214, Worcester Road, Droitwich Spa, Worcestershire. *l*, *nat. phot.*
- 1941 EDWARDS, Rev. Canon T. G., M.A., F.Z.S., *Council*, Holy Trinity Vicarage, Tulse Hill, London, S.W.2. *l*.
- 1933 ELGOOD, W. S., M.A., North Brink, Wisbech, Cambs. *l*.
- 1923 ELLIS, H. WILLOUGHBY, F.R.E.S., F.Z.S., M.B.O.U., Friary Hill, Weybridge, Surrey. *c*, *orn*.
- 1937 EMBRY, B., F.R.E.S., 23, Mill Drive, Uckfield, Sussex. *l*. *A.F.*
- 1932 ENNIS, L. H., c/o "Bandora," Portmore Park Road, Weybridge, Surrey. *l*. *A.F.*
- 1935 ENSOR, G. A., "Oakleigh," Knoll Road, Dorking, Surrey. *l* and *hym*.
- 1920 FARMER, J. B., "Ashleigh," Beatrice Road, Oxted, Surrey. *l*, *c*.

YEAR OF
ELECTION.

- 1924 FASSNIDGE, WM., M.A., F.R.E.S., 13, Commercial Road, Parkstone, Dorset. *l, n, hem.*
- 1930 FERRIER, W. J., F.R.E.S., 86, Portnalls Road, Coulsdon, Surrey. *l, A.F.*
- 1936 FINNIGAN, W. J., 87, Wickham Avenue, Cheam, Surrey. *ent, nat, phot.*
- 1920 FORD, L. T., *Council*, "St Michaels," 70, Park Hill Road, Bexley, Kent. *l.*
- 1941 FORD, R. L. E., F.R.E.S., "Durfold," 34, Park Hill Road, Bexley, Kent. *ent.*
- 1939 FORSTER, H. W., 76, Station Road, Chingford, London, E.4. *c.*
- 1915 FOSTER, T. B., "Downlands," 24, York Road, Selsdon, Surrey. *l.*
- 1933 FRASER, ANGUS, The Palace, Cuddesdon, Oxford. *c.*
- 1930 GILLIAT, F. T., B.A., F.R.E.S., Two Brewers Inn, Chipperfield, Herts. *l.*
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l.*
- 1936 GOODBAN, B. S., 90, Tolcarne Drive, Pinner, Middlesex. *l.*
- 1935 GOODLIFFE, F. D., M.A., F.R.E.S., Lord Wandsworth Agricultural College, Long Sutton, Basingstoke. *ec. ent.*
- 1942 GOODSON, A. L., 26, Park Road, Tring, Herts. *l.*
- 1926 GORDON, D. J., B.A., F.R.E.S., 24, Coulson Street, London, S.W.3. *c, l.*
- 1936 GOWING-SCOPES, E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l. A.F.*
- 1924 GRANT, F. T., 37, Old Road West, Gravesend, Kent. *l, c.*
- 1926 GREY, Mrs OLIVE, F.Z.S., 66, Barrington Court, Pages' Hill, London, N.10. *ent.*
- 1891 HAMM, A. H., M.A., A.L.S., F.R.E.S., 22, Southfield Road, Oxford. *l.*
- 1943 HARDS, C. H., 19, Mayfield Road, Rainbow Hill, Worcester. *l.*
- 1902 HARE, E. J., F.R.E.S., Harrow Place, Pinden, Dartford, Kent. *l.*
- 1936 HARRIS, W. H. A., 48, Corringway, London, W.5. *l.*
- 1924 HARWOOD, P., F.R.E.S., Granish Cottage, Aviemore, N.B. *l.*
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, London, S.W.2. *l.*
- 1924 HAWKINS, C. N., F.R.E.S., *Hon. Secretary (Minuting)*, 23, Wilton Crescent, Wimbledon, London, S.W.19. *l.*
- 1929 HAWLEY, Lt.-Col. W. G. B., D.S.O., "Amber Cottage," Bodenham, near Salisbury, Wilts.
- 1943 HAYNES, H., 6, Nelson Road, Salisbury, Wilts. *l.*
- 1938 HAYNES, R. F., "The Sanctuary," Burney Road, West Humble, Dorking, Surrey. *l. A.F.*
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental Agricola, Casilla Correo 71, Tucuman, Argentina. *l, orn, c.*
- 1935 HEDGES, A. V., F.R.E.S., "Ballovale," Santon, Isle of Man. *l.*

YEAR OF
ELECTION.

- 1920 HEMMING, Capt. A. F., C.M.G., C.B.E., F.Z.S., F.R.E.S., c/o Ministry of Home Security, Whitehall, S.W.1. *l.*
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c. A.F.*
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., c/o Messrs Griffiths and McAlister, 10, Warwick Street, Regent Street, London, W.1. *l.*
- 1927 HEWER, H. R., M.Sc., D.I.C., Ministry of Food, Imperial Hotel, Colwyn Bay, N. Wales (Mark envelope Personal).
- 1937 HICK, E. PENTLAND, F.R.E.S., "Athol House," Fulford Road, Scarborough, Yorks. *l. A.F.*
- 1927 HOWARD, Flt. Lieut. J. O. T., M.A., R.A.F.V.R., c/o Barclays Bank Ltd., 161, New Bond Street, London, W.1. *l. A.F.*
- 1931 HOWARTH, T. G., B.E.M., F.R.E.S., 77, Woodland Rise, Muswell Hill, London, N.10. *l. A.F.*
- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea, Essex. *l. ent.*
- 1929 HUGHES, ARNOLD W., Lower Farm, Quainton, Bucks. *l.*
- 1939 HULLS, L. G., F.C.S., F.R.M.S., F.R.E.S., "Rax," Chidham, near Chichester, Sussex. *ent.*
- 1938 HUMPHREYS, J. A., c/o W. H. A. Harris, Esq., 48, Corringway, London, W.5. *l.*
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l.*
- 1928 JACKSON, F. W. J., "The Pines," Ashtead, Surrey.
- 1940 JACKSON, Capt. REGINALD A., F.R.E.S., R.N., *Council*, "The Hermitage," Bishops Waltham, Hants, and The Junior United Services Club, London, S.W.1. *ent, l. A.F.*
- 1923 JACOBS, S. N. A., *Vice-President*, "Ditchling," 54, Hayes Lane, Bromley, Kent. *l. e l.*
- 1924 JAMES, A. R., "Braemar," Morgan Crescent, Theydon Bois, Essex. *l.*
- 1936 JAMES, L/Bdr. W. H., 390th S.L. Battery R.A., A.P.O. 725. *l. A.F.*
- 1928 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, London, N.8. *ent.*
- 1942 JAKUES, J. M., 12, Coulsdon Road, Coulsdon, Surrey. *b.*
- 1925 JARVIS, C. McK., 68, Clyfford Road, West End Road, Ruislip, Middlesex. *c.*
- 1938 JARVIS, F. V. L., B.Sc., 21, Shirley Avenue, Sutton, Surrey. *l. A.F.*
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea, Hants. *l.*
- 1928 KETTLEWELL, H. B. D., M.A., M.B., B.CHIR., M.R.C.S., L.R.C.P., F.R.E.S., "Homefield," The Common, Cranleigh, Surrey. *l.*
- 1910 KIDNER, A. R., "Starfell," Southdown Road, Seaford, Sussex. *l.*
- 1925 KIMMINS, D. E., Wray Castle, Ambleside, Westmorland. *l. n.*

YEAR OF
ELECTION.

- 1933 KING, H., D.SC., F.R.S., "Gavarnie," Wise Lane, Mill Hill, London, N.W.7. *l, orn.*
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, London, S.W.3.
- 1941 LAST, H. R., 12, Winkworth Road, Banstead, Surrey. *c, l.*
- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l.*
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l.*
- 1934 LINE, H. V., 11, Priory Avenue, Petts Wood, Orpington, Kent. *l.*
- 1933 LIPSCOMB, Major C. G., Misterton, Somerset. *l. A.F.*
- 1937 LISNEY, A. A., M.A., M.B., F.R.E.S., The Red House, Narborough, Leicester. *l.*
- 1942 LLOYD, Major C. T., D.SC., PH.D., 25, Belmont Avenue, New Malden, Surrey. *l.*
- 1935 LOWE, Major J. H. B., R.E., c/o Lloyds Bank Ltd., Cox's & King's Branch, 6, Pall Mall, London, S.W.1. *l. A.F.*
- 1931 MACNULTY, B. J., "Rutland," 67, All Saints Road, Sutton, Surrey. *l. A.F.*
- 1892 MAIN, H., B.SC., F.R.E.S., F.Z.S., 9, Woodside Road, Woodford Wells, Essex. *l, nat. phot, c.*
- 1889 MANSBRIDGE, W., M.SC., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool, Lancs. *l, c, etc.*
- 1932 MARCON, Rev. J. N., Christ Church Vicarage, Seaside Road, Eastbourne, Sussex. *l.*
- 1930 MARSH, DUDLEY G., "Russells Farm House," St George's Lane, Hurstpierpoint, Sussex. *l.*
- 1922 MASSEE, A. M., D.SC., F.R.E.S., East Malling Research Station, Kent. *l.*
- 1932 MELLOWS, W. T., M.B.E., LL.B., "The Vineyard," Minster Precincts, Peterborough, Northants. *l.*
- 1942 METCALFE, PERCY, C.V.O., R.D.I., A.R.C.A., 70, Madrid Road, Barnes, London, S.W.13. *l.*
- 1943 MILTON, P. W., 23, Woodstock Road, Carshalton, Surrey. *c, ent.*
- 1938 MINNION, W. E., 57, Lloyd Court, Pinner, Middlesex. *l. A.F.*
- 1889 MOORE, H., F.R.E.S., 9 Hoopwick Street, Deptford, London, S.E.8. *l, hem, d, e l, e hym, e d, mi.*
- 1920 MORISON, G. D., B.SC., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen, N.B. *ec. ent.*
- 1930 MORLEY, A. McD., County Education Office, Springfield, Maidstone, Kent.
- 1937 MORTIMER, D. A., "Westbourne House," West Street, Dudley, Worcs. *hym. A.F.*
- 1940 MORTIMER, Mrs D. A., "Westbourne House," West Street, Dudley, Worcs. *ent.*
- 1937 MOWBRAY, M. J., 80, Woodlands Avenue, Wanstead, London, E.11. *ent. A.F.*

YEAR OF
ELECTION.

- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey.
ent.
- 1934 MUSGRAVE, A. J., B.Sc., A.R.C.S., c/o Barclays Bank Ltd., 41,
Broadway, London, W.13. *ent.* A.F.
- 1906 NEWMAN, L. W., Salisbury Road, Bexley, Kent. *l.*
- 1930 NIBLETT, M., 10, Greenway, Wallington, Surrey. *galls.*
- 1938 ODD, D. A., 11, Wickham Avenue, Cheam, Surrey. *l.*
- 1932 O'FARRELL, A. F., B.Sc., A.R.C.S., F.R.E.S., "Oaklands," Old Post
Office Road, Crawley, Sussex. *od, cr, ent.*
- 1934 OLIVER, G. B., Harefield Road, Luton, Beds. *l.*
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, London,
S.E.3. *l.*
- 1942 PARFITT, R. W., 11, Dunsdon Avenue, Guildford, Surrey. *l.*
- 1940 PAYNE, L. G., *Council*, 22, Marksby Avenue, Richmond, Sur-
rey. *c.*
- 1940 PAYNE, R. M., c/o 22, Marksby Avenue, Richmond, Surrey. *c.*
- 1940 PELHAM-CLINTON, 2nd Lieut. EDWARD C., R.A., Trebles Holford,
Bishops Lydeard, near Taunton, Somerset. *l.* A.F.
- 1928 PERKINS, J. F., B.Sc., F.R.E.S., 42, Wordsworth Road, Harpenden,
Herts. *hym.*
- 1933 PEYTON, A. G., 18, Manor Square, Stafford. *l.*
- 1943 PITMAN, C. M. R., "Malvern," Southampton Road, Clarendon,
Salisbury, Wilts. *l, orn. b, etc.*
- 1924 PRIEST, C. G., 5, Kensal Road, Paddington, London, W.10. *l.*
- 1903 PRISKE, R. A. R., F.R.E.S., 37, Holway Road, Taunton, Somerset.
l, mo.
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Link-
field Lane, Redhill, Surrey. *l.*
- 1942 RICHARDSON, AUSTIN, Beaudesert Park, Minchinhampton, Glos. *l.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middle-
sex. *l.*
- 1936 RICHARDSON, N. A., Chadwell Farm, Stoke Hammond, Bletchley,
Bucks. *l.* A.F.
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Sur-
rey. *ent.* (Life Member.)
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon,
London, S.W.20. *l.*
- 1939 RIPPON, C., M.A., J.P., F.R.E.S., *Council*, "Red Lodge," Cold Ash,
Newbury, Berks. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough,
Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., "Flat 15," 2, Mansfield Street,
London, W.1. *l, n.*
- 1942 ROCHE, P. J. L., F.R.E.S., M.R.C.S., L.R.C.P., 8, Lansdowne Road,
Bedford. *c, hem.*

YEAR OF
ELECTION.

- 1935 ROYFFE, D. W., 99, Hughenden Road, High Wycombe, Bucks.
c, l. A.F.
- 1932 RUDLAND, W. L., F.R.E.S., 211, Caversham Rd., Reading, Berks. *l.*
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., "Lancaster Herald," "Windy Walls," Gatehouse of Fleet, S.W. Scotland. *l.*
- 1915 RUSSELL, S. G. CASTLE, "Springetts," Seaview Road, Highcliff-on-Sea, Hants. *l.*
- 1908 ST AUBYN, Capt J. G., F.R.E.S., 14, Purley Knoll, Purley, Surrey.
rey.
- 1927 SCOTT, Col. E., M.B., "Hayesbank," Ashford, Kent. *l. A.F.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Ralli Bros., Ltd., Calcutta.
(Life Member.) l.
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough, Northants. *l.*
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1938 SHERRIN, W. R., A.L.S., F.Z.S., South London Botanical Institute,
323, Norwood Road, Herne Hill, London, S.E.24 *c, l.*
- 1939 SIVITER SMITH, P., F.R.E.S., "Squirrels," Little Aston Park,
Streetly, Staffs. *l.*
- 1921 SMART, Major H. D., M.C., M.D., B.S., F.R.E.S., 26, Snakes Lane,
Woodford Green, Essex. *l.*
- 1941 SMITH, Lieut. FDK. WM., R.N.V.R., "High Mains," Closeburn,
Dumfries; 52b Hulbert Road, Bedhampton, Hants. *l, hym. A.F.*
- 1939 SMITH, S. GORDON, F.L.S., F.R.E.S., "Estyn," Boughton, Chester.
ent.
- 1938 SNELL, B. B., "Woodsome," Bromborough, Cheshire. *l. A.F.*
- 1941 SPARROW, R. W., 134, Regents Park Road, London, N.3. *l.*
- 1943 SPREADBURY, W. H., 35, Acacia Grove, New Malden, Surrey.
- 1938 STAFFORD, A. E., "Corydonis," 83, Colborne Way, Worcester
Park, Surrey. *l.*
- 1927 STANLEY-SMITH, F., F.R.E.S., *Hon. Secretary (Corresponding),*
"Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1928 STANLEY-SMITH, Mrs MAUD, "Hatch House," Pilgrim's Hatch,
near Brentwood, Essex. *l.*
- 1937 STEDALL, H. P. P., "Cherry Cottage," Prestwood, Great Missen-
den, Bucks. *ent.*
- 1940 STEEL, W. O., 16, Upsdell Avenue, Palmers Green, London, N.13. *c.*
- 1935 STEPHENS, J. A., F.R.E.S., 44, Mount Road, Chatham, Kent. *c.*
- 1938 STERLING, D. H., 36, Estella Avenue, New Malden, Surrey. *l. A.F.*
- 1942 STIDSTON, Eng. Capt. S. T., F.R.E.S., R.N., 1, Palace House, Bays-
water Road, London, W.2, and "Ashe," Ashburton, Devon.
l. A.F.
- 1936 STIGANT, Miss B., 22, Brock Street, Bath, Somerset. *hortic. ent.*
- 1924 STOREY, W. H., c/o Barclays Bank, High Street, Shoreditch,
London, E.1. *ent. A.F.*

YEAR OF
ELECTION.

- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., 36, Wymondley Road, Hitchin, Herts.
- 1929 STUBBS, G. C.
- 1939 SUMMERS, E. J., 7, Cavendish Road, Sutton, Surrey. *c, hem.*
- 1934 SUTTON, GRESHAM R., 176, Princes Road, Buckhurst Hill, Essex. *l, c.*
- 1943 SWANN, E. L., 282, Wootton Road, King's Lynn, Norfolk. *c.*
- 1916 SYMS, E. E., F.R.E.S., F.Z.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, London, E.11. *n, orth, od, t.*
- 1942 TALBOT, M. J. R., c/o The Foreign Office; S.W.1. "By Angola Bag." *l.*
- 1922 TAMS, W. H. T., F.R.E.S., 20, Ranelagh Avenue, Fulham, London, S.W.6. *l.*
- 1913 TACHELL, L. S., F.R.E.S., "Rockleigh Cottage," Swanage, Dorset. *l.*
- 1941 TAYLOR, H. G. W., 11, Granville Road, Sidcup, Kent. *c.*
- 1934 TAYLOR, J. O., 176, Petts Wood Road, Petts Wood, Kent. *l.*
- 1925 TAYLOR, J. SNEYD, M.A., F.R.E.S., P.O. Box 45, Graaff-Reinet, Cape Province, Union of S.A. *l.*
- 1938 TETLEY, J., "White Cottage," Silverlea Gardens, Horley, Surrey. *ent.*
- 1935 TOMPKINS, F. H., "Clifton," 18, Forest Side, Worcester Park, Surrey. *ent.*
- 1937 TONGE, A. E., F.R.E.S., "Ashville," Trafford Road, Alderley Edge, Cheshire. *l.*
- 1934 TUNSTALL, H. G., 11, St James Avenue, Ewell, Surrey. *l.*
- 1940 TURNER, A. D., 19, Wychwood Close, Canon's Park, Middlesex. *ent.*
- 1943 TURNER, J. FINCHAM, 17, Litchfield Avenue, Morden, Surrey. *l, hym.*
- 1943 VESEY-FITZGERALD, BRIAN, F.L.S., M.B.O.U., Red Rise, Burley, near Ringwood, Hants. *ent, orn.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. CHAS., 9, Priory Road, Hook Road, Surbiton, Surrey. *l.*
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 8, Cottenham Park Road, Wimbledon, London, S.W.20. *l.*
- 1930 WAKELY, S., *Vice-President*, 17, Warminster Road, S. Norwood, London, S.E.25. *l.*
- 1935 WALLIS-NORTON, Capt. S. G., R.A.S.C., Roche Court, Fareham, Hants. (*Life Member*). *ent. A.F.*
- 1936 WARRIER, R. E., "Birchwood," Birchwood Park Avenue, Swanley, Kent. *l.*
- 1939 WATKINS, Lieut. N. A., M.A., F.R.E.S., R.N.V.R., Belcombe Court, Bradford-on-Avon, Wilts. *l. A.F.*

YEAR OF
ELECTION.

- 1920 WATSON, D., "Crossways," Hightown, Ringwood, Hants. *l.*
 1928 WELLS, CLIFFORD, "Dial House," Crowthorne, Berks. *l.*
 1911 WELLS, H. O., "Linden House Hotel," 9 College Road, Epsom, Surrey. *l.*
 1937 WELTI, A., F.R.E.S., "Foxbush," Tillingdown Lane, Caterham, Surrey. *l.*
 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing, Sussex. *l.*
 1927 WHITE, A. GRANVILLE, "Hilltop," Chaldon, Surrey.
 1925 WILLIAMS H. B., LL.D., F.R.E.S., "Croft Point," Bramley, Surrey. *l.*
 1932 WILLIAMS, S. W. C., *Council*, 17, Beresford Road, Chingford, London, E.4. *l.*
 1938 WILLIS, J. R., "Vine Cottage," West Horsley, Surrey. *l. A.F.*
 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
 1926 WOOTTON, W. J., "Wannock Gardens," Polegate, Sussex. *l.*
 1927 WORMS, The BARON DE, M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., 12, Harcourt Terrace, Salisbury, Wilts. *l. orn.*
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Members will greatly oblige by informing either of the Hon. Secretaries of any errors in, additions to, or alterations required in the above addresses and descriptions

REPORT OF THE COUNCIL FOR 1942.

The close of the 71st year of our existence sees the nation in the fourth year of war, despite which the Society has succeeded in maintaining its traditions and its objects while its strength remains unimpaired.

Two members have given their lives for their country: Lieut. J. A. P. Russell, Gordon Highlanders, son of our member, Mr A. G. B. Russell, "Lancaster Herald," in Malaya, and Pilot Officer A. J. L. Bowes, R.A.F.V.R., in a raid on Germany. Corporal T. G. Howarth, B.E.M., was captured in Malaya and is now a prisoner of war in Japanese hands. In all, 47 members are known to be serving in the Armed Forces, and one of them, Sapper D. H. Sterling, has been "Mentioned in Despatches" during the year. In the field of learning Mr A. H. Hamm, a member since 1891, has had conferred upon him the degree of Master of Arts (*honoris causa*) by Oxford University. Miss L. M. Chapman was made an Honorary Member in January in recognition of her own services to the Society, coupled with those of her late sister and brother.

Mr Denvil, who held offices as Vice-President, Minuting Secretary, and Assistant Editor, was called up for military service in May, and in consequence tendered resignation of all his offices. Since there is little hope of him being able to attend regularly enough to occupy the chair next year, your Council appointed Mr R. J. Burton as Vice-President in his stead. To carry on the secretarial and editorial duties during his absence Mr C. N. Hawkins kindly consented to act as an Assistant Secretary, and your Council have accordingly nominated him as one of the Secretaries for next year, while conveying to Mr Denvil the hope that he will, ere long, be able to resume the duties he has carried out so efficiently during the past seven years, and at the same time tendering to him the thanks of the Society for his services so far rendered.

During the year there have been 2 deaths (in addition to those killed in action), 3 resignations, and 1 member has been struck off; 12 new members have completed their obligations. The Society on December 31st consisted of 4 Honorary, 4 Life, 200 Full, and 51 Country Members, a total of 259, an increase of 4 as compared with last year.

Mr Frampton, the Cathedral Verger, whose responsibilities include the care of The Chapter House, has continued to be very helpful and considerate throughout the year, and if at winter meetings the rooms have sometimes not been so warm as might be desired, we must attribute this to the exigences of the times, with labour and fuel both in short supply.

The Treasurer's accounts will show a small excess of expenditure over income during the year, entirely attributable to the concession made to serving members. Your Council sees no reason for alarm in this: reserves to meet the deficiency are ample, and remedies have been

planned for next year should the concession produce still greater effect. The arrears of subscriptions are down to a record low level for recent years, which speaks highly for the loyalty of members in difficult times and for the efficiency and diplomacy of the Treasurer.

In addition to the Annual and Exhibition Meetings, eleven Ordinary Meetings have been held during the year with an average attendance of 32. Papers have been read by Messrs Stephens, Sneyd Taylor, Rippon, and Dr Kettlewell, Messrs Jacobs, Doubleday, L. T. Ford, L. C. Payne; by one visitor, Mr E. A. Robins, and a discussion was introduced by Baron de Worms and Dr E. A. Cockayne. The thanks of the Society have been conveyed to the lecturers on each occasion, but Mr Syms also has earned the gratitude of members for maintaining the flow of papers when so few are able to find the time to prepare them. The lantern has been in use on three occasions, the Honorary Lanternist, Mr J. H. Adkin, officiating with his customary efficiency. The rooms were opened for identification of specimens and references to the Library on four other evenings during the summer. Twelve field meetings were held during the season at Effingham, Bookham, Chilworth and Albury, Epping Forest, Horsley, Byfleet, Ashstead, Chalfont, Ranmore, Westerham, Bookham again and Oxshott. The attendance thereat has generally been lower than usual, owing, no doubt, in great measure to the number of members serving in the Armed Forces. The organisation throughout has again been in the capable hands of Mr Coote, who also deserves the thanks of members for his untiring efforts which have made the outdoor meetings so pleasant. The Annual Exhibition was again held in October and was an outstanding success. More than 144 members and visitors attended, and there was an abundance of excellent exhibits. The arrangements were once more left to Mr J. H. Adkin, and the Society owes him yet another debt of gratitude for the efficient work he has put in.

Part 2 of the "Proceedings and Transactions for 1941/42," published on 15th August 1942, contains xx + 81 pages with 8 plates, and includes papers read by Messrs Niblett, Castle Russell, Eagles, Coulson, and Andrews, the obituary notice of Mr R. W. Attwood, and other contributions. This part, with Part 1 mentioned in our last report, completed our publication for the year.

The most notable gift of insects during the year was received from Mr H. A. Leeds. It consisted of three store boxes containing long series of three British Satyrids, *Maniola tithonus*, *M. jurtina*, and *Coenonympha pamphilus*. They included examples of all the varieties of those species actually taken by the donor, but he says that as other forms are known he wishes the Society to be free to deal with the collection in whatever way it finds best. Mr Leeds hopes later to present to the Society a manuscript describing the aberrations. The thanks of the Society have been conveyed to Mr Leeds for this further example of his generosity. The Rev. G. Wheeler gave a number of Lepidoptera, chiefly from the Hebrides, and other gifts have been received from Messrs

A. W. Dennis, H. G. Denvil, L. T. Ford, E. E. Syms, J. A. Stephens and S. Wakely, to whom the thanks of the Society are due.

The Curator, Mr Ashby, has continued his perpetual task of rearranging the Society's collections. During the year he has dealt with the Odonata and Trichoptera, and has made considerable progress with the British Coleoptera.

The Librarian, Mr Syms, says that nothing of importance has taken place in the Library during the year. Fewer books were borrowed, but many were consulted at our meetings. Owing to the war, expenditure has been much restricted, so that when peace returns there will be serious arrears to overtake.

"The Biology of the N. American Vespine Wasps" was presented by the Editors of the "Entomologist's Record"; Stainton's "Entomologist's Companion," edition 1852, by Mr R. J. Collins, F.R.E.S., and a number of separates by the author, Mr M. Niblett. The thanks of the Society have been conveyed to the donors. The Society purchased the new (1939) edition of South's "Moths of the British Isles" in two volumes, and the "Entomologists' Monthly Magazine" for 1942. The usual magazines and publications of kindred societies were acquired by exchange.

HON. TREASURER'S REPORT, 1942.

This year our income has not been enough to cover our expenses. The shortage is £4 18s 2d. Bearing in mind the increase in printing costs and the growing loss of income due to the remission of the subscriptions of serving members, this result is not surprising. Nor is it a cause for alarm, as our accumulated surpluses still amount to over £50. Nevertheless, the present year will be an anxious one for your Council because our subscription income will, I expect, be still less, the cost of printing and paper is rising, and our other expenses cannot be reduced.

Members have backed the Society loyally by paying their subscriptions so well that the arrears at 31st December 1942 were lower than I have known them.

Our benefactors, too, have stood by us. Once again our most generous anonymous friend has given £20 to the Illustrations Fund. It is this splendid help that has enabled us to issue twelve fine plates for 1941-42.

Again we are indebted to Mr Hy. J. Turner, to the Editors of the "Entomologist's Record and Journal of Variation," to those who gave donations to the Publication Fund, to members of the Forces who made a donation of their subscriptions, and to those members who gave donations to help meet the cost of remitting the subscriptions of serving members.

I should like to give a personal word of thanks to members and friends for their helpful spirit.

BALANCE SHEET.

Our investments are unaltered, and their value is almost unchanged.

INCOME AND EXPENDITURE ACCOUNT.

Subscription income at £124 2s 6d is down by £11 and the grant to the Publication Fund is £70, an increase of £16. We should thus have been £27 worse off than last year but for the following savings. First, our ordinary expenses are down by about £7; second, we had a special item of expense last year in connection with the Bright Bequest, and, lastly, this year no grant is made to the Library Fund. These savings total £20, leaving the account £7 worse than last year. Thus, while we were £2 15s to the good last year, we are this year £4 18s 2d to the bad.

CAPITAL ACCOUNT.

The Capital Account is unchanged because the twelve Entrance Fees received in the year are taken to the Library Fund and were about

enough to meet the unusually small expenditure on books and binding. We cannot expect the Library Fund to continue to make no demand on our income.

PUBLICATION FUND.

The printing and posting of Parts I and II of the " Proceedings and Transactions for 1941-42 " cost £85 7s 6d, which is £20 more than last year. Both Donations to the Fund and Sales of " Proceedings " show an improvement on last year, but nevertheless the grant from the Income and Expenditure Account had, as you have just heard, to be raised by £16 to £70.

ILLUSTRATIONS FUND.

We opened the year with £55 15s 1d in hand out of the six donations of £20, and to this is added the seventh donation, making a total of £75 15s 1d. Of this £30 17s 2d was spent in the year, leaving £44 17s 11d in hand for the future.

Again your thanks and mine are due to the Council's auditor, Mr F. J. Coulson, and to the Members' auditor, Mr S. W. C. Williams.

T. R. EAGLES.

INCOME AND EXPENDITURE ACCOUNT—Year to 31st December 1942.

Rent of Rooms ...	£50 0 0	Subscriptions (Arrears and Current) ...	£124 2 6
Insurance ...	1 5 9	Interest—	
Gratuities, Cleaning, etc. ...	3 4 0	£154 14s 0d 4% Consols ...	£6 3 8
Secretarial Expenses ...	15 5 2	£591 15s 3d 3½% Conversion Stock ...	20 14 2
Treasurer's Expenses ...	2 17 10	£100 0s 0d 3% Defence Bonds ...	2 8 2
	£72 12 9	Deposit Interest ...	1 7 1
Subscriptions to South Eastern Union of Scientific Societies, Wicken Fen Fund, Footpaths Preservation Society, and Ramblers' Association	2 14 0		£30 13 1
Grant to Publication Fund	70 0 0	Less Income Tax ...	14 7 0
			16 6 1
		Balance, being Excess of Expenditure over Income carried to Balance Sheet ...	4 18 2
			£145 6 9

CAPITAL ACCOUNT—Year to 31st December 1942.

Transfer to Library Fund ...	£1 10 0
Balance at 31st December 1942 ...	1084 5 11
Entrance Fees ...	1 10 0
	£1085 15 11

LIBRARY FUND—Year to 31st December 1942.

Purchase of Magazines and Books	...	...	£1 18 9	Balance at 1st January 1942	...	...	£5 7 10
Balance at 31st December 1942	...	...	4 19 1	Transfer from Capital Account	...	...	1 10 0
			£6 17 10				£6 17 10

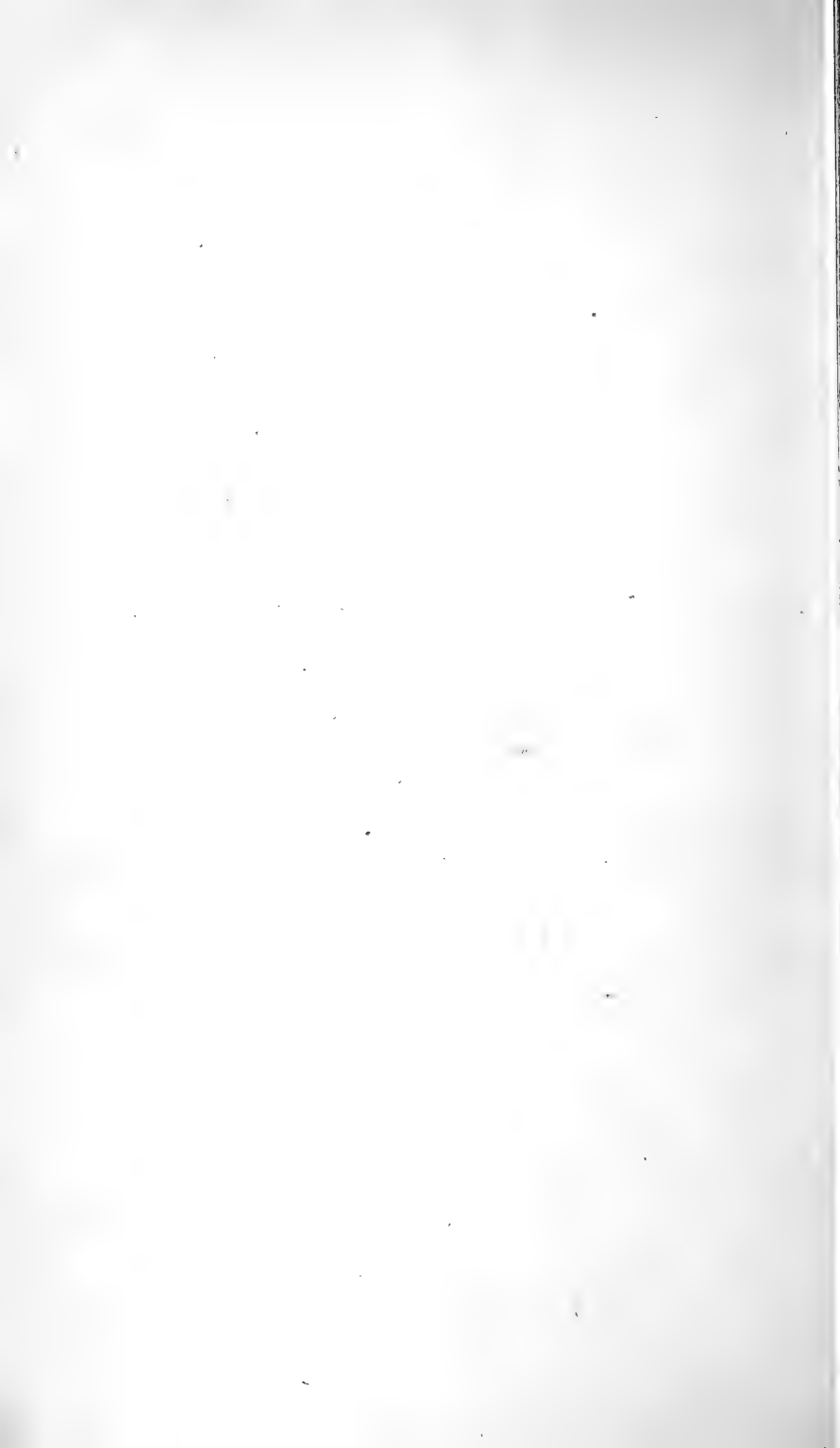
PUBLICATION FUND—Year to 31st December 1942.

Printing and Posting Proceedings and Transactions	...	...	£85 7 6	Balance at 1st January 1942	...	...	£4 2 11
Balance at 31st December 1942	...	...	2 13 0	Sale of Proceedings	...	...	5 12 7
				Donations	...	...	3 0 0
				Interest on 3½% War Stock (Miss E. F. and L. M. Chapman)	£10 10s, less Income Tax	£5 5s	5 5 0
				Grant from Income and Expenditure Account	...	...	70 0 0
			£88 0 6				£88 0 6

XXI

ILLUSTRATIONS FUND—Year to 31st December 1942.

Blocks and Printing	...	...	£30 17 2	Balance at 1st January 1942	...	...	£55 15 1
Balance at 31st December 1942	...	...	44 17 11	Donation	...	...	20 0 0
			£75 15 1				£75 15 1



ABSTRACT OF PROCEEDINGS.

14th FEBRUARY 1942.

Mr S. WAKELY, President, in the Chair.

The decease of Mr J. A. P. Russell, killed in action in the Far East, was announced.

Mr Percy Metcalf, 70 Madrid Road, Barnes, S.W., was announced as elected a member

Mr C. N. Hawkins exhibited, on behalf of Dr Blair and himself, a series of *Colias croceus*, Fourc., bred from ova obtained from a ♀, form *helice*, Hb., taken at Box Hill during September last by Dr Blair, and remarked upon their exhibit.

Dr K. Blair and Mr Hawkins subsequently communicated full notes on the exhibit. (See *Trans.*)

Mr R. W. Sparrow exhibited two species of *Tortrix* larvae taken from a beech stump in Highgate Woods.

Mr J. A. Stephens then gave his paper on "Some Interesting Coleoptera of the Chatham District." (See *Trans.*) A discussion took place, in which the President, Mr L. G. Payne, Mr Coulson, and others took part.

14th MARCH 1942.

The PRESIDENT in the Chair.

The President exhibited the *Tortrix Pammene roseticolana*, Zell., the larvae of which species feed in Wild Rose hips, a fruit from which the much-talked-of Hip Syrup is made. He also exhibited an active slug-shaped larva found on fungus. It constructs a glutinous web on which it is able to move in agile fashion. Found under dead wood at Norwood. It was considered to be Dipterous.

Mr J. O. Taylor exhibited a series of a very dark form of *Amorpha* (*Laothoe*) *populi*, L.

Mr R. W. Sparrow exhibited pupae of *Hamaearis lucina*, L., bred from ova laid by a ♀ taken at Horsley during the Field Meeting there in 1941. Also the Coleopteron, *Soronia grisea*, L., taken at Elstree during February last.

Mr E. J. Summers exhibited specimens of *Spilosoma lutea*, Hufn. (*lubricipeda*, L. in part.) of the form *fasciata*, Tugwell.

Mr A. A. W. Buckstone exhibited a long series of *Spilosoma lutea*, Hufn. (*lubricipeda*, L. in pt.) of the form ab. *fasciata*, Tugwell, together with typical specimens and the ab. *zatima*, Stoll, and communicated the following note on his exhibit: "This was part of the J. P. Robson strain of ab. *fasciata*, originating from a pairing of typical 'buff ermine' with ab. *zatima*. Several generations were bred by Rob-

son, who then supplied me with pupae and from the resulting moths I inbred three generations (three pairings each generation), the only reversion to the typical form being three specimens exhibited. I obtained no reversion to *zatima*. The specimens shown are typical of about one thousand bred."

A paper, "Notes on some European Waders observed in the Kar-roo," which had been sent in by our member, Mr J. Sneyd Taylor of Graaf Reinet, S. Africa, was then read. (See *Trans.*)

11th APRIL 1942.

The PRESIDENT in the Chair.

Dr K. G. Blair exhibited a specimen of the North American Longicorn, *Smodicum cucujoides*, Say, taken alive by the President, in South Norwood ("Ent. Mo. Mag.," 1941: 279). Another example of the same species taken in a house at Putney in 1934 has recently been recorded by Mr Donisthorpe ("Ent. Rec.," 1941: 10). The larva bores in the heart wood of oak and hickory, etc., though the adult is stated to live beneath the bark and there is a prospect that it may establish itself in this country. The specimen has been generously presented by Mr Wakely to the National Collection; also the Scolytid beetles, *Coccotrypes eggersi*, Haged., together with a button destroyed by them. The beetle bores in Ivory Nuts and when these are cut up and manufactured into buttons may make its appearance. Another species of the same genus that is sometimes found in this country is *C. dactyliperda*, F., which burrows in date stones.

Capt. R. A. Jackson, R.N., spoke of his Easter trip to Aviemore, and showed ova of *Poecilopsis* (*Nyssia*) *lapponaria*, Bdv., and small larvae of *Polia* (*Aplecta*) *tineta*, Brahm.

Mr S. Wakely exhibited series of *Lozopera beatricella*, Wals., *L. francillana*, Fabr., and *L. dilucidana*, Stph., and pointed out that the larvae of all three could be sought for during the next few weeks. All were seed-feeders on umbelliferous plants, and retired into the flowering stem during the winter months, pupation not taking place till late spring. *L. beatricella* was much the rarest of the three species, being attached to the Hemlock (*Conium maculatum*, L.), which is a local plant. *L. francillana* and *L. dilucidana* were both fairly common on Wild Carrot (*Daucus carota*, L.) and Wild Parsnip (*Peucedanum sativum*, Benth.) respectively. The moths could be distinguish by the positions of the first and second lines on the forewings. In *L. beatricella* these lines were parallel; in *L. francillana* they tended to converge on the dorsal edge of wing; while in *L. dilucidana*—a slightly smaller species—the first line had a distinct break in it before reaching the costa.

Mr Hy. J. Turner exhibited a store-box containing numerous species of Lepidoptera collected for him by our fellow-member, Capt. K. J. Hayward, while staying in Cyprus nearly 20 years ago. The following

species were included *Euplagia (Callimorpha) quadripunctaria*, Poda (hera, L.) with its eastern form *fulgida*, Obthr. characterized by the hindwings being of a more intense colour and the light lines on the forewings being narrower than in its more western form; a long series of *Ophiusa algira*, Linn., a rare visitor to Britain; *Tarache lucida*, Hufn., a near relative of our *T. (Acontia) luctuosa*, Esp., and another rare visitor to this country; *Emmelia (Crastia) trabealis*, Scop. (*sulphuralis*, L.), a very local species with us; *Mormo (Mania) maura*, L.; *Triphaena (Rhyacia) orbona*, Hufn. (*comes*, Hb.), with the form *fumida*, Warr., a dark suffused form peculiar to Cyprus; a long series of the recently described "processionary moth," *Thaumatopeoa wilkinsoni*, Tams; *Utetheisa (Deiopeia) pulchella*, L.; *Plusia gamma*, L.; *Euphyia (Camptogramma) bilineata*, L., a long series of the f. *testaceolata*, Stdgr., in which the forewings and parts of the hindwings are testaceous instead of yellow; *Apatele (Acrionicta) rumicis*, L.; *Agrotis (Rhyacia) ipsilon*, Rott. (*suffusa*, Schiff.); series of the beautiful yellow-underwing, *Epilecta linogrisea*, Schiff.; of *Autophila cataphanes*, Hb.; of *A. limbata*, Stdgr.; of *Ocnogyna loewii*, Z. v. *pallidior*, Christ., a much lighter race; of *Scioptila (Perigea) eriopoda*, H.-S., etc., and *Aglossa cuprealis*, Hb.; *Pyrallis farinalis*, L.; *P. costalis*, Fb.; etc.

Mr L. G. Payne exhibited a potted plant of the rare and local British lily, *Gagea lutea*, Ker., from Yorkshire, known as the "Yellow Star of Bethlehem." He also made observations on the season from a recent short trip in the neighbourhood of Dorking.

Mr C. Rippon exhibited a long series of lantern slides to illustrate stages in the life-history of various species of Lepidoptera, many of the slides being coloured. He also, to an extent, gave hints on his own method of making the coloured slides.

Dr G. V. Bull communicated a series of Notes of his Observations from Sandhurst, Kent, during 1941.

"The Spring was late and some of the early butterflies were scarce, particularly *Lycaenopsis argiolus*, L., *Polyommatus icarus*, Rott., and *Heodes phlaeas*, L. A prolonged examination of specimens of *Zygaena filipendulae*, L., which was unusually abundant in a field near my house, resulted in the capture of three confluent forms and a good many minor variations in the many hundred which were examined or bred. There were but few parasites, only one batch of *Apanteles zygaenarum*, Mshl., being found and a few single odd species.

In early June a female *Heliothis peltigera*, Schiff., was taken at dusk at Valerian and a short series was bred, and larvae were met with later on at Rye. *Colias croceus*, Frery., was seen in the neighbourhood after an interval of three years and I was lucky to breed 50 per cent. of ♀ f. *helice*, Hb., from a small number of pupae. A *Colias*, presumably *helice*, was seen at Northiam, but as it evaded capture it may have been *C. hyale*, L., which was, I believe, reported elsewhere in the South. *Aglais urticae*, L., was very common. *Vanessa atalanta*, L., fairly common on garden flowers, and *Nymphalis io*, L., more than in 1940.

Vanessa cardui, L., was rarely seen and only singly except on one day when I saw two. *Limenitis camilla*, L. (*sibilla*, L.), seemed to be more widely spread. *Zephyrus (Thecla) (Ruralis) betulae*, L., is common over a wide area between Ashford and Appledore, and I have recently found one ovum close to my house. As far as I know, there is no other record in this immediate neighbourhood. Seven *Acherontia (Manduca) atropos*, L., pupae were brought to me from nearby potato fields as well as two from Romney Marsh. Whether the species was more abundant than usual I cannot say; certainly my wants were more widely known."

Dr Bull gave a list of first dates, 1941—*Pieris rapae*, L., 12th April; *Euchloë cardamines*, L., 22nd April; *Pieris brassicae*, L., 4th May; *P. napi*, L., 11th May; *Lycaenopsis argiolus*, L., 28th May, a worn specimen, the only one seen in the spring; *Hesperia malvae*, L., 13th May; *Erynnis tages*, L., 17th May; *Polyommatus icarus*, Rott., 7th June; *Brenthis euphrosynë*, L., 17th May; *Heodes phlaeas*, L., 1st brood not seen; *Coenonympha pamphilus* L., 19th May; *Pararge megera*, L., 28th May; *Agriades sylvanus*, Esp. (*Ochlodes venata*, Brem.), 16th June.

The lowest and highest barometric readings were 30.55 ins. on 2nd December and 29.05 on 19th January. These readings are not corrected to sea-level.

14th MAY 1942.

Mr F. D. COOTE, Vice-President, in the Chair.

It was reported that Mr Wm. Fassnidge, a colonel in the Home Guard, had been seriously injured in the recent accidental shooting on Salisbury Plain.

The Curator exhibited a box of Hebridean Lepidoptera presented to the Society by the Rev. G. Wheeler. The specimens were collected by Professor J. W. Heslop Harrison: *Parasemia plantaginis*, Linn., a small form from Vatersay; *Arctia caja*, Linn., Sandray; *Caradrina clavicarpis*, Scop. (*quadripunctata*, Fabr.), South Uist; *Triphaena comes*, Hübn., light, dark and red forms from Raasay, Scalpay, and South Rona; *Triphaena janthina*, Schiff., Raasay; *Lygris (Eustroma) testata*, Linn., Raasay; *Entephria caesiata*, Schiff., Eigg and Raasay; *Xanthorhoe montanata*, Schiff., Pabbay; *Cleora (Boarmia) repandata*, Linn., Raasay; *Saturnia pavonia*, Linn., Coll; *Hepialus fusconebulosa*, D. G. (*velleda*, Hübn.), Rhum; also *Apatete (Acrionicta) menyanthidis*, View., from Rannoch; *Eulype hastata*, Linn., and *Plemyria bicolorata*, Hufn., from Forres, and some well-marked specimens of *Spilosoma (Diacrisia) lutea*, Hufn. (*lubricepeda*, Linn. in pt.), from Middlesbrough.

Mr J. A. Stephens exhibited Coleoptera taken at Cobham Park this month: *Carpophilus 6-pustulatus*, Fb., taken 7.v.42, under bark of Hornbeam—two taken, but one escaped. In the past this has been regarded as an introduced insect and very doubtful if British, but see Fowler, Vol. 6, p. 111, which seems to prove it to be British. *Cryptophagus ruficornis*, S., rare, 1.v.42, under bark (loose) of old Beech tree. Roots of Broccoli showing ravages of the larva of *Ceuthorrhynchus pleu-*

rostigma, Mm., from his allotment, 14.v.42. This species causes much damage to the plants by diverting the sap. The larva pupates in the ground under the plant.

Capt. R. A. Jackson, R.N., gave the following notes for April and early May: A very early season, *Thecla rubi*, L. (not fresh), seen 27.iv.42, whilst at Lyndhurst; *Cleora* (*Boarmia*) *cinctaria*, Schiff., was out (1 ♂, 2 ♀) on the 25th. On 3.v.42 *Euchloë cardamines*, L., *Pieris rapae* and *P. napi* were abundant. *Hesperia malvae* and *Erynnis* (*Nisoniades*) *tages*, L., everywhere, whilst *Brenthis euphrosyne* was just appearing and one *Hamearis lucina*, L. (♂) was seen. *Lithina chlorosata*, Scop. (*petraria*, Gn.) was just emerging. On the 9.v.42, at Woodfidley, the "bee hawks" were very common, both *Hemaris tityus*, L. and *H. fuciformis*, L. Also *C. cinctaria* seen (again 1 ♂ and 2 ♀), *Semiothisa liturata*, Clrck., *Bupalus piniaria*, L., and *Opisthograptis luteolata*, L., ♂ and ♀.

Mr H. W. Andrews exhibited the Dipteron, *Noeëta pupillata*, Flin. (Diptera-Trypetidae), bred from heads of *Hieracium* (Hawkweeds).

Mr W. J. Finnigan exhibited larvae of *L. camilla*, L. (*sibilla*, L.), *Hygrochroa syringaria*, L., and *Amphipyra pyramidea*, L.

Mr R. W. Sparrow exhibited larvae of *Scopula* (*Acidalia*) *ternata*, Schrank. (*fumata*, Steph.), from Witherslack; pupae of *Myelois cribrella*, Hb., from Finchley, etc.

Mr T. R. Eagles exhibited larvae of *Laspeyria* (*Arentia*) *flexula*, Schiff.; *Episema* (*Diloba*) *caeruleocephala*, L., and *Hemithea aestivaria*, Hb.; and galls on sallow thought to have been caused by an aphid.

Mr F. Stanley-Smith exhibited samples of grass from a lawn, patches of which were brown apparently due to the attacks of an aphid; and on behalf of Mrs Stanley-Smith larvae of *Chrysoptera* (*Plusia*) *moneta*, Fb., in all stages of growth.

Mr V. E. August exhibited a larva of *Arctia villica*, L., from N.W. Sussex.

11th JUNE 1942.

Mr F. D. COOTE, Vice-President, in the Chair.

The following new members were declared elected:—Mr John Victor Banner, M.R.C.S., L.R.C.P., of 41 Varndean Gardens, Brighton, and Mr R. W. Parfitt, of 1 Dunsden Avenue, Guildford, Surrey.

Mr C. Rippon, M.A., F.R.E.S., exhibited samples of two broods of *Panaxia* (*Callimorpha*) *dominula*, Linn., reared by himself from parents at least one of which was of ab. *medio-nigra*, Cockayne. In one case where both parents were of this form the offspring included examples (two of which, as well as the parents, were shown) of an extreme form of this variety with an unusual amount of black on the hindwings, etc., and he suggested this intensification of the black might be due to the high temperature at which the larvae had been reared. He said he was still breeding specimens of this brood and that those so far reared at

lower temperatures were like their parents, but he hoped to be able to give further information on this point later. With regard to his other brood, he showed some typical specimens, six specimens of the normal ab. *medio-nigra* form, and six specimens, in each case, of two new forms which he designated, for the time being, form "A" and form "B". Mr Rippon said that in this case the female parent was a captured example of ab. *medio-nigra* from a North Berkshire locality but that the male parent was unknown. This brood produced 18 types, 16 ab. *medio-nigra*, 16 "B," and 10 "A." He also exhibited two examples of ab. *bimacula*, Cockayne, the homozygous form produced by the same gene which gives rise to the heterozygous *medio-nigra*. In his subsequent remarks Mr Rippon mentioned that his forms "A" and "B" appeared to be combinations of a hitherto unknown genetic form with the typical and the *bimacula/medio-nigra* forms respectively. (See also "Entomologist," 1942: 75, p. 75, Pl. 2, figs. 1-4.)

Dr H. B. D. Kettlewell exhibited a very large and magnificent range of forms of *P. dominula* and of the closely allied species *P. rossica*, Kolen. (which he distinguished), including, besides many from his own collection, and one from the Cockayne Coll., a number of specimens lent by the Brit. Mus. (Nat. Hist.) from the Oberthür and Joicey Collections, and one from the Doubleday Collection which is ab. *ochromaculata*, Fuchs, on the left side and typical *dominula* on the right, thus proving that *ochromaculata* is a genetic form. He then read a paper giving the results of his five years' intensive study of these species. (See *Trans.*, Part I.)

Some discussion followed, and Dr H. B. Williams said that Mr Rippon's brood were clearly, as regards the *bimacula/medio-nigra* gene, the product of a known heterozygote, the ♀ parent, paired with a moth in which this gene was not present. As regards the new form, it appeared to be expedient, in accordance with the precept of William of Ockham, to adopt the view that the explanation was precisely similar, i.e., the new form, of which approximately 50 % appeared, was a heterozygote of a new mutation of *dominula*, and the unknown ♂ was a heterozygote of similar appearance. This hypothesis, of course, involved the exciting possibility that there was in North Berkshire an aberration of *dominula* as yet unseen by man in its homozygous condition. Its genetics would be similar to those of *bimacula*, i.e., it would have a recognisable heterozygote. He illustrated this by a short account of the present position of his experiments with *Boarmia repandata*, ab. *conversaria*, Hb., which was, in the form described and figured by Hübner, a heterozygote.

After discussing the changes observed in recent years in the Berkshire colony, Dr Williams referred shortly to the *italica-persona* series of forms. Richard Goldschmidt ("Zeitschrift für Induktive Abstammungs- und Vererbungslehre," xxxiv, 229) had shown these to be multifactorial. Standfuss had crossed *persona* with *dominula* and described the results in "Handbuch der palaarktischen Gross-Schmetterlinge,"

published in 1896. In the long series of careful and painstaking experiments recorded in detail in this book, Standfuss had before him all the data necessary to formulate the Mendelian theory, at that time lost to knowledge, but with typical Teutonic mentality he considered his results in the light of a preconceived theory, that in crosses of distinct forms one sex had a preponderating influence. His crosses gave moths with red hindwings, except in one brood (*dominula* ♂ × *persona* ♀), in which half the brood had yellow hindwings. These results, coupled with the difficulty in pairing referred to by Dr Kettlewell, were consistent with the view that *dominula* and *persona* were distinct species, notwithstanding the inconclusiveness of the examination of the genitalia by Mr Tams, and if this view came to be established, *romanovi* would have to be regarded as a hybrid.

Mr F. T. Grant exhibited a beetle, *Catopidius depressus*, Murr., recently added to the British list, which he had captured on an office window at Gravesend on 20th March 1935. He said Dr Blair had told him the species is found in Spain and Western France, and usually occurs in rabbit burrows and badger earths.

Dr Blair exhibited two larvae and a pupa of *Argynnis cydippe*, Linn., from Ashted, where the larvae had been found near their food-plant amongst dead bracken, which usually made them difficult to see.

9th JULY 1942.

The PRESIDENT in the Chair.

It was announced that Mr R. J. Burton had been invited to fill the office of Vice-President (President-elect) of the Society, left vacant through the calling up for Military Service of Mr Denvil, and that he had agreed to act.

Also that the Meeting Room would be open on the fourth Thursday in each month from now to the end of September, from 6 p.m. till 7.30 p.m., for reference to the Society's Collections and Library.

Mr S. N. A. Jacobs exhibited all 49 of the British species of the genus *Lithocolletis* and sundry of their mines; also drawings of their wing-patterns on an enlarged scale, to serve in illustration of his subsequent paper on the genus.

Mr Hy. J. Turner exhibited bred series of three species of *Lithocolletis*, viz., *L. quercifoliella*, Fisch., *L. viminetorum*, Sta., and *L. ulmi-foliella*, Hb., and a box containing long series of the two species of the genus *Leptocircus*, Swains. (*Papilionidae*), viz., *L. meges*, Gdt., and *L. curius*, Fab., and gave an account of their characteristics. The genus is somewhat anomalous and has even been separated as a distinct sub-family. The species are small, with transparent forewings, black at the base and on the outer margin with a band outside the basal black area, reaching halfway down the hindwing; this wing is narrow and extended into a very long tail and black in colour. In the former species this band is beautifully green in colour, in the latter species

the band is white. The species are abundant in the Indo-Malay Region, from Assam, Tenasserim, the Malay Peninsula, Malacca, Siam, Java and Sumatra. They are said to hover over water in company with the smaller dragonflies and are strong in flight.

The President exhibited: (1) On behalf of Dr G. S. Robertson, larvae and imagines of a Sawfly which attacks the Common Yellow Flag Iris (*Iris pseudacorus*, Linn.), the species being *Rhadinoceraea micans*, Klug. (2) On his own behalf, a beetle, *Orchestes alni*, Linn., the larvae of which feed in the leaves of Elm, taken at Coulsdon; also a large Caddis Fly, (?) *Phrygania striata*, Linn., taken in the vicinity of Norwood Lake.

Capt. Jackson, R.N., exhibited cut portions of stems of various bushes and trees showing empty pupa cases of British Clearwing Moths, *in situ*, projecting from their burrows. The species were *Aegeria (Synanthedon) sphecoformis*, Schiff.; *A. (S.) andrenaeformis*, Lasp.; *A. (S.) flaviventris*, Stdgr.; *A. (S.) vespiformis*, Linn. (= *cynipiformis*, Esp.); and *A. (S.) culiciformis*, Linn.

Mr August exhibited a larva of the Narrow-bordered Bee Hawk-Moth, *Hemaris tityus*, Linn., on Scabious.

Mr Hawkins exhibited: (1) Pupae and a larva of a Dipteran (The Cabbage Fly, *Hylemyia brassicae*, Linn.) found in his garden at Wimbledon attacking the root of a Savoy Cabbage. The plant had turned a leaden-bluish colour and had wilted, and the larvae were found to have severed all the rootlets and to have made grooves in the outside of the main tap-root. The pupae were found in the earth nearby. (2) Curious, pendant, cigar-like houses made by an apparently rare Saw Fly, found in his garden attacking leaves of Rose trees. A larva which had emerged from one of the houses and died was also shown. This larva cuts off a portion of the edge of a leaf and rolls it up into a cigar shaped structure, similar to that made by certain weevils, and then eats the remainder of the leaf. When one leaf is finished the larva moves the house in some way to a fresh leaf, cuts a new strip and adds it to the basal part of the house, increasing its length and diameter, and then proceeds to eat the new leaf. The name of the species is at present unknown but it is hoped to breed the imago and ascertain this in due course. (It was subsequently suggested that it might be *Pamphilius inanitus*, Le Pelletier.)

Mr Jacobs then read his paper "Notes on the Genus *Lithocolletis*." (Publication deferred.)

Mr H. W. Andrews exhibited examples of *Merodon equestris*, Fb. (The Narcissus Fly), showing its range of variation in wing marking.

13th AUGUST 1942.

The PRESIDENT in the Chair.

Canon Edwards exhibited aberrations of *Argynnis selene*, Schiff. (approximating to Frohawk's figure of ab. *marphisa*, Spngbrg., and *A. euphrosyne*, Linn. (a well blotched ab.) and three aberrations of *Melitaea athalia*, Rott. (one male small and very dark; two females, one with

partial absence of black on forewings, one very well marked), also a very pale *Cocnonympa pamphilus*, Linn., and other insects, all taken in S. Cornwall between 15th June and 6th July last.

The President exhibited a fine series of *Scopula ternata*, Schrnk. (*Acidalia fumata*, Steph.) bred from larvae sent to him by Mr L. T. Ford from Witherslack. The larvae were brought safely through the winter by being sleeved on a growing plant of heather. They fed on the plant till spring, when fresh bramble leaves were tried. These were eaten at once, and the larvae quickly became full-fed.

Mr M. Niblett exhibited a number of *Chalcididae* in tubes, bred from Galls: Chalcids bred from Gall-causing CYNIPIDAE—*Rhodites rosae*, L. *Biorhiza pallida*, Oliv. *Andricus quadrilineatus*, Htg. *A. radialis*, Fab. *Cynips kollari*, Htg. *Isocolus rogenhoferi*, Wachtl. *Aulacidea hieracii*, Bouché. *A. hypchoeridis*, Kieff. *Liposthenes latreillei*, Kieff. Gall-causing CECIDOMYIDAE—*Geocrypta* (*Perrisia*) *galii*, H. Loew. *Japiella* (*Perrisia*) *veronicae*, Vallot. *Dasyneura* (*Perrisia*) *epilobii*, F. Loew. TRYPETIDAE—*Sphenella marginata*, Fal. *Trypeta zoë*, Mg. *Orellia colon*, Mg. *O. ruficauda*, Fab.

Dr K. G. Blair exhibited: (1) A male specimen of *Leucania lithargyria*, Esp., from Frome, Somerset, 11th July 1942, set in what was believed to be the "calling" attitude in which it was found, and read the following note:—"It was found hanging upside down from a horizontal grass stem, with the wings flexed ventrally, all the legs turned forward, though I do not think the hinder pair were gripping any support, and the abdomen lengthened and hanging downwards (i.e., dorsal wards), thus fully exposing the bunches of black hairs beneath its base. This presumably is a 'calling' attitude, the brushes probably diffusing a scent for the attraction of the female. The use of such a scent by the male is well known in the Hepialidae but I am unaware whether observations on the use of these brushes by certain male *Leucaniae* have been published." (2) Half of a mass of cocoons of *Aphomia sociella*, Linn., found in a hole in an oldish Beech tree. The mass had been cut through obliquely across the cocoons, the section resembling the hexagonal cells of a bees' comb.

Mr L. G. Payne exhibited the plant, Elecampane (*Inula helenium*, Linn.), also two species of Coleoptera, *Athous villosus*, Geoff., the largest British species of the genus, found under bark at Pyrford, Surrey, 24th July 1942; and male and female of *Chrysolina graminis*, Linn., a very local metallic species found on *Tanacetum vulgare*, Linn., in S. Yorkshire, 14th July 1942.

Mr V. E. August exhibited larvae of *Siona lineata*, Scop. (= *Scoria dealbata*, Linn.) bred from ova laid by a female taken in N.W. Sussex.

Mr T. R. Eagles exhibited the introduced and now common weed, *Erigeron canadensis*, Linn., and the fruit of a Mandrake (*Mandragora* sp.); he also showed the larva of *Comibaena pustulata*, Hufn. (*bajularia*, Schiff.) and a Dipterous parasite bred from a larva of *Argynnis cydippe*, Linn., found at Ashted, Surrey. As to the last exhibit, Mr Hawkins

remarked that he had bred what appeared to be a similar parasite from a larva of the same species from the same locality and it had been identified as *Phryxe vulgaris*, Fall.

Mr E. J. Summers exhibited a rare beetle, *Ptinus sexpunctatus*, Pz., taken by him in Sutton, Surrey, running over a newspaper on 31.5.42. This species is usually found in Bees' nests.

Mr F. D. Goodliffe exhibited *Pteromalus liparæ*, Gir., a Chalcid parasite of a Dipterous fly, *Lipara lucens*, Mg., found in galled heads of *Arundo phragmites*, Linn.

Mr B. S. Doubleday's paper, "A brief Introduction to the study of Chalcids," was then read, in the unavoidable absence of the author, by the Assistant Minuting Secretary. (See *Trans.*)

10th SEPTEMBER 1942.

The PRESIDENT in the Chair.

The President exhibited a good series of the fasciated form of the "Buff Ermine Moth," *Spilosoma lutea*, Hufn. (*lubricipeda*, L. in pt.), ab. *fasciata*, Tgwll., bred from ova of Clapton origin.

Mr L. T. Ford exhibited larvae of *Sterrhopteryx hirsutella*, Hb., hatched towards end of July from ova laid by a female taken at Meathop Moss, Witherslack, Lancs.; also two cases containing mature larvae.

Mr J. Deal exhibited parasites of the ova of *Phalera bucephala*, L., probably the Proctotrupid, *Telenomus punctatissimus*, Ratz.

Mr S. R. Ashby exhibited the large Chalcid, *Leucospis gigas*, Fab., from Switzerland.

Mr J. A. Stephens exhibited a number of rare or local Coleoptera from the Chatham district, i.e., *Anisotoma orbicularis*, Hrbst., taken in Cobham Park from rotten Hornbeam in company with *Sphindus dubius*, Gyll., 22.viii.42; rare. *Saprinus virescens*, Pk., beaten out of rotten Ivy on the ground, Cobham Park, 14.viii.42; rare. *Malthodes mysticus*, Kies., 22.v.42; rare. *M. guttifer*, Kies., 26.vi.42; rare. *M. fuscus*, Waltl. (*pellucidus*, Kies.), 11.vi.42; usually rare. *M. fibulatus*, Kies., 22.v.42; usually rare. All taken by beating shrubs and trees in Cobham Park. *Orchesia undulata*, Krtz., taken in plenty from decaying Silver Birch tree, Cobham Park, 22.viii.42; rare. *Lixus paraplecticus*, L., taken in cōp. at New Hythe on Water Parsnip, on bank of Medway river, 20.viii.42; rare. *Ceuthorhynchus picitarsis*, Gyll., beaten out of Nettles and Horseradish, Chatham, 18.viii.42; usually rare. He also showed three species given to him by Dr Massee, i.e., *Gnorimus nobilis*, L.; *Metoeus paradoxus*, L., and *Lytta vesicatoria*, L.

Mr T. R. Eagles exhibited larvae of *Chloroclysta siterata*, Hufn., from Ash at Ranmore Common; of *Eupithecia centauriata*, Schiff. (*oblongata*, Thnbg.) from *Scabiosa succisa*, L., Bookham, and seeds of *Magnolia sinensis*, Stapf.

Mr A. Bliss exhibited larvae of *Ectropis* (*Tephrosia*) *bistortata*, Goeze (*biundularia*, Bkh.) from ova laid by a female taken at the Ashstead Field Meeting on 4.vii.42.

Dr K. G. Blair exhibited: (1) A cribbage board sent by Dr G. S. Robertson from the British Legion's quarters at Storrington. Several of the holes in this are plugged with clay, and Dr Robertson writes of it as follows:—(13.vii.42) "The steward first noticed one or two holes filled up about a fortnight ago, and one day noticed a 'wasp' flying about and settling on the board. He watched it carefully and noticed it takes in caterpillars and plug up the holes . . . One dull sunless day he did not see the insect at all; rain came on and it did not spend the night in one of the holes as it always used to, and it never appeared again."—"It will be seen that nine holes in one group are stopped, as well as a tenth some distance away. Two of the nine, however, though stopped in front are open behind; the next hole in the upper row was stopped at the back when received, and contained two parasitized lepidopterous larvae, one apparently a Tortricid, the other a good deal larger with inflated tibiae on the posterior thoracic legs as in *Diurnea fagella*, Fab., but the date seems too early for this larva to be full-grown. I then opened the middle hole of the top series from behind and found it to contain a full-grown Hymenopterous larva (? *Odynerus* sp.) and amid the debris of the provisions were the remains of two larval heads about the same size as that of the '*Diurnea*,' but not that species. There was also part of a thin white Hymenopterous cocoon as though one of the victims had been parasitized but the parasite after emerging from its host and spinning its cocoon had itself been devoured by the *Odynerus* larva. I then sealed up the larva again in the hole, and was unwilling to disturb any more and thus risk the chance of identifying the nest-maker." [This subsequently proved to be *Ancotrocerus pictus*, Ct.] (2) Some *Cassida* beetles sent by a former member and Past President, Mr E. J. Bunnett. These were bred by Mr Bunnett from larvae destructive to Beet, but had lost their colour, as this group of beetles is wont to do, but Mr Bunnett supplied a coloured drawing of one, made from life. The beetle was an immature form of *C. vittata*, Vill., which when mature is characterized by a brilliant golden streak on each elytron (an example in 4% formalin which preserves this colour, though bluer than in life, was also sent by Mr Bunnett). In the specimens submitted there was no trace of this streak, but around the areas where its ends should come there was, when alive, a pinkish suffusion, no trace of which now remained. This immature form is referred to as var. a by Weise, "Naturgesch. Ins. Deutschl." 6.

Mr J. O. Taylor exhibited *Argynnis aglaia*, L., including one with pale left forewing apparently caused by curled scales. Shoreham, Kent, 4.vii.42.

Mr R. J. Burton exhibited larvae of *Aplecta* (*Polia*) *advena*, Fab., from Suffolk.

Mr H. R. Last exhibited the beetles *Criocephalus polonicus*, Mots. (*ferus*, Kraatz) from Banstead, Surrey, 18.viii.42, and *Necrophorus in-*

interruptus, Steph., male and female, both taken flying around a dustbin at Banstead on 17.viii.42, the male at 8.15 p.m. and the female at 12.15 p.m. As to the former species, Mr Last mentioned that Joy gives it as "R. South England to Notts." Fowler gives it in his "Supplement." First found in New Forest in Scots Pine by F. Gilbert Smith and introduced as British by Willoughby Ellis, "Ent. Record," 1903. Has been taken in the Woking district and Dr Blair had told him that he (Dr Blair) had also taken it on the Surrey Heaths. In this case the beetle was caught by Mr Last's cat. As to the *Necrophorus*, Mr Last said he had taken it once before in similar circumstances but had not known they flew by day, and that Mr L. G. Payne had also taken it around a dustbin. He also said that he had often taken *Necrophorus humator*, Fab., in carrion traps but never *interruptus*.

Mr F. J. Coulson announced that he had obtained specimens of *Gnathoncus nidicola*, Joy, from a Tit's nest given to him by the President, from Norwood.

Mr L. T. Ford then read his paper, "Notes on Collecting Species of the Genus *Elachista*." (See *Trans*.)

14th NOVEMBER 1942.

The PRESIDENT in the Chair.

It was announced that Corporal T. G. Howarth, B.E.M., F.R.E.S., had now been officially reported to be a Prisoner of War in Japanese hands, also that P.O. A. J. L. Bowes, R.A.F.V.R., is presumed to have been killed in action on 24th July last. The death was also announced of Dr H. G. Harris, of Southampton, on 3rd October last.

Dr K. G. Blair exhibited two specimens of *Spilosoma lutea*, Hufn., reared from eggs received from Mr Wakely. One of these was very similar to others of the same brood recently shown by Mr Wakely, but in the other the black bands on both fore and hindwings were much more completely and evenly developed (v. *fasciata*, Tug.) (cf. "Entom.," 1894, p. 205, fig.). Also, on behalf of Lady Robinson, a mass of cocoons of *Apanteles pallipes*, Reinh. From it there emerged besides the *Apanteles* (56, all females) the hyperparasites *Hemiteles fulvipes*, Grav. (79 males, 6 females) and *Pezomachus instabilis*, Först. (3 females). He also exhibited some living larvae of the Dermestid beetle *Otesias serra*, F., about which he read the following note:—

"On September 1st last at Bedwyn, Wilts, when pulling to bits part of a rotten standing Beech trunk riddled with burrows of *Sinodendron cylindricum*, L., I found that in many of the old burrows a spider (not taken) had established its lair, and around about the web were the larvae of *Otesias serra*, F. These were usually several together, 3-6, and were presumably feeding on the rejectamenta from the spider's larder, but of what this consisted was not ascertained; they have since fed freely on dead flies, bluebottles, etc., but do not attack bees. The

large blue fly, *Pyrellia eriophthalma*, Mcq., was also common in the burrows, in both sexes, again usually several together, some inches deep in the soft wood, but were quite alive and crawled away, or eventually flew, on being disturbed, and, so far as I remember, I did not find their corpses by the spiders' dens. Other hibernators present in considerable numbers were Chalcids, *Pteromalus deplanatus*, Nees, but these were mostly in the smaller burrows of *Ptilinus pectinicornis*, L., and I should think had no connection with *Otesias*, although the latter has been reported as a probable host."

Mr S. R. Doudney exhibited several males of *Saturnia pavonia*, L., taken by "assembling" at Albury Common; also a series of *Cerura furcula*, Clrek., bred from Witherslack larvae, and a number of *Aricia agestis*, Schiff. (= *astrarche*, Bergst.) showing considerable variation in the white spots on the undersides of the forewings.

Mr T. R. Eagles showed the larva of *Leucania lithargyria*, Esp.; the Fungus known as "Blewitts" (*Tricholoma personatum*, Fr.), and fronds of the following species of Ferns, in connection with Mr L. G. Payne's paper:—*Osmunda regalis*, L., and its var. *cristata*, ; *Phyllitis scolopendrium*, L., varieties; *Gleichenia gibba*, ; *Athyrium filix-foemina*, L.; *Blechnum spicant*, L.; *Polystichum setiferum*, Woynar (*angulare*, Willd.) and vars.; *Adiantum pedatum*, L., var.; *Polystichum braunii*, Fée.; *Dryopteris filix-mas*, Sch., vars.; *Asplenium adiantum-nigrum*, L.; *Onoclea sensibilis*, L.; and *Struthiopteris germanica*, Willd.

Mr L. G. Payne then showed a large number of Lantern Slides of British Ferns, and annotated his exhibit.

12th DECEMBER 1942.

The PRESIDENT in the Chair.

The following new members were declared elected:—Messrs Peter John Bell, B.A., F.L.S., of Dudswell Rise, Berkhamstead, Herts.; Tom Blest, of Homestead, Higham Lane, Tonbridge, Kent (Country); Arthur Leslie Goodson, of 26 Park Road, Tring, Herts. (Country); Major Charles Thomas Lloyd, D.Sc., Ph.D., of 25 Belmont Avenue, New Malden, Surrey; Messrs Austen Richardson, of Beaudesert Park, Minchinhampton, Glos. (Country); Patrick Joseph Lindsay Roche, F.R.E.S., of Middlesex Hospital, W.1; Captain (E.) Stanley T. Stidston, R.N., of Ash. E., Ashburton, Devon (Country); and Mr M. J. R. Talbot, of Froyle Place, Alton, Hants. (Country).

Mr E. A. Robins (a visitor) gave a most interesting lecture, illustrated with a large number of beautiful lantern slides, on "The Spider, its life-history and habits," in which he dealt with many species, British and tropical, and their webs and nests. After some discussion, a very hearty vote of thanks was proposed from the Chair and carried by acclamation.

Canon T. G. Edwards exhibited two specimens of *Cidaria (Lampropteryx) otregiata*, Metcalf, taken in S. Cornwall at light in June 1937.

First recorded in Dorset in a restricted locality in 1927. He said the species is related to *C. (L.) suffumata*, Schiff., which it closely resembles, though Meyrick says it is nearer to *Cidaria (Euphyia) silaceata*, Schiff.

Mr H. Britten exhibited the following interesting species of Diptera (*Trypetidae*) taken at Coulsdon, Surrey, during 1942:—(1) *Tephritis hyoscyami*, Linn. (2) *T. vespertina*, Lw. (3) *T. bardanae*, Schr. (4) *T. conjuncta*, Lw., bred from flower heads of *Chrysanthemum leucanthemum*, Linn. (5) *Noeëta pupillata*, Fal., bred from flower heads of *Pieris hieracioides*, Linn. (6) *Orellia falcata*, Scop. (7) *O. ruficauda*, Fab. (8) *O. colon*, Mg. (9) *O. winthemi*, Mg. (10) *O. serratulae*, Linn. (11) *Gonioglossum wiedemanni*, Lw. (? Mg.).

Mr H. W. Andrews exhibited a small series (4 males and 3 females) of the rare Syrphid Dipteron *Rhingia rostrata*, Linn., captured in September 1942, at Bexley, Kent.

Mr H. Moore showed a number of preserved spiders and spiders' nests.

9th JANUARY 1943.

The PRESIDENT in the Chair.

Captain R. A. Jackson, R.N., showed a short series of a species of *Caradrina* (Lep. Heterocera), since confirmed by Mr Tams of the Natural History Museum as *C. ambigua*, Schiff. These were taken between 28th August and 9th September at Bishops' Waltham, and are all females of a pale grey shade. He also showed examples of *C. blanda*, Schiff. (= *taraxaci*, Hb.) and *C. alsines*, Brahm, also taken at Bishops' Waltham, for comparison, together with two much older *C. ambigua* from Bournemouth and Torquay. The peculiar colder grey shade of the insects taken this year made them at first difficult to identify, but examination by Mr Tams settled their identity. It is believed that the grey coloration of the primaries is due to the fact that the moths are very fresh, whilst the other two *ambigua* shown for comparison have turned browner with age. That this change in coloration does take place was proved by a reference to the species in the Oberthür Collection. This species had not been observed before at Bishops' Waltham, which is certainly 15 to 20 miles from the coast.

Mr L. G. Payne exhibited an owl's pellet found on Bookham Common in April 1942 and dissected by him in December. It consisted almost entirely of a species of beetle, *Carabus nemoralis*, Müll., one of the large nocturnal Ground Beetles, not previously recorded for the Common by him nor published in the Society's records. He found 121 separate parts of these beetles as follows:—66 leg parts, 40 elytra parts, 11 abdomen parts, and 4 heads. NOTE.—Mr Coulson subsequently announced that this beetle is included in his supplementary list now in course of preparation.

The meeting then proceeded to the special item for the evening, an Exhibition of, and discussion on, the Lithosiinae.

The Baron de Worms contributed a paper (read in his unavoidable absence, by the Secretary, Mr F. Stanley Smith) in which he gave a brief account of our various British species. (See *Trans.*)

Dr E. A. Cockayne exhibited preserved examples of the various types of British Lithosiid larvae and read a short paper on the subject in which he drew attention to the different kinds of plumage found on different species and to the possibility of these differences being of classificatory value. He also showed sketches of the different types of hairs (highly magnified) found on these larvae, to illustrate his paper. (See *Trans.*)

23rd JANUARY 1943.

ANNUAL MEETING (with which was combined the ORDINARY MEETING).

Mr S. WAKELY, President, in the Chair.

Reports of the Council and Treasurer, with the Balance-Sheet, were read and adopted.

The following is a List of those members declared elected for Officers and Council during the ensuing twelve months:—*President*—R. J. Burton, L.D.S., R.C.S.Eng. *Vice-Presidents*—S. Wakely and Stanley N. A. Jacobs. *Treasurer*—T. R. Eagles. *Secretaries*—C. N. Hawkins, F.R.E.S. (*Minuting*); F. Stanley Smith, F.R.E.S. (*Corresponding*). *Editor of Proceedings*—Hy. J. Turner, F.R.E.S., F.R.H.S. *Curator*—S. R. Ashby, F.R.E.S. *Librarian*—E. E. Syms, F.R.E.S. *Council*—J. H. Adkin; K. G. Blair, D.Sc., F.R.E.S.; H. Britten; F. D. Coote, F.R.E.S.; Canon T. G. Edwards, M.A., F.Z.S.; L. T. Ford; Capt. R. A. Jackson, R.N., F.R.E.S.; L. G. Payne; C. Rippon, M.A., J.P., F.R.E.S.; and S. W. C. Williams.

Messrs Harry Haynes, Charles H. Hards, S. C. S. Brown (L.D.S., R.C.S.Eng., H.D.D.Edin.), and Wm. Henry Spreadbury were declared elected members.

Mr Wakely showed a living specimen of the fish-louse *Argulus foliaceus*, L.

Mr Niblett exhibited galls on *Quercus robur* and gall-wasps of *Biorhiza pallida*, Oliv., and *B. aptera*, Bosc. (Hymenoptera, *Cynipidae*), including one living specimen of *B. aptera*, five weeks old.

Mr Arthur Robinson, a visitor, showed a long and varied series of *Erannis defoliaria*, Clerck, all taken on fences at Enfield in December.

Col. Cardew exhibited 2 specimens of *Limenitis camilla* (*sibilla*), L., ab. *nigrina*, Weym., from Horsham, July 1941; an *Aglais urticae*, L., ab. *nigra*, Tutt, Horsham, September 1941; and another, ab. *ichnusoides*, Selys-Lng. ("Cat. Lep. Belg.," 1837), taken by G. B. Oliver in North Bucks in 1919.

The President then read his Address.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen,—It is very gratifying, in these war-ridden years, to hear from the Council's Report that the Society is in such a satisfactory condition. In spite of the small balance on the wrong side during the year, as reported by the Treasurer, we are able to face the future with no misgivings on that score, and if, as we sincerely hope, the war should terminate in the not too distant future, there is little doubt but that our finances will soon recover from their present temporary slight set-back.

A reminder as to the healthy vitality of the Society is the fact that the membership shows a slight increase during the year—namely, 259 as against 255. Although the Field Meetings have not been quite so well attended as might have been hoped, the Indoor Meetings have appeared to me to have been well up to, if not above, the average.

The Council had a minor crisis during May, when Mr Denvil was called up for military service. As he was not only Minuting Secretary and Assistant Editor, but also our President Elect, some anxiety was caused, which was happily relieved by the acceptance by Mr Burton of the post of Vice-President, Mr Hawkins taking over the secretarial duties. Considering the need of filling these important posts quickly, I think special thanks are due to these two members for taking over at such short notice.

It was a relief to us all to hear that Corporal T. G. Howarth was still alive and well, though, unfortunately, a prisoner in Japanese hands. How well I recall the days when he was one of our most youthful members, and we look forward to the time when he, and many other members now in the Services, can be with us once again.

Two of our members have made the supreme sacrifice for their Country. Lieutenant J. A. P. Russell, of the Gordon Highlanders, was killed in action in Malaya on 31st January. He was the elder son of Mr A. G. B. Russell, M.V.O., F.R.E.S., "Lancaster Herald" and Earl Marshal's Secretary. Lieutenant Russell joined the Society in 1936, and was one of our keenest members. It is on record that he captured several *Aplasta ononaria*, Fuess., one of our rarest Geometers, some years ago in Kent, while in the wonderful Scottish area of Rannoch he showed his independent spirit by working successfully in untried localities.

Pilot Officer A. J. L. Bowes, R.A.F.V.R., lost his life on the 24th July when his machine was shot down during a raid on Germany. Just previous to the war he was an Assistant Master at Charterhouse, but volunteered for the R.A.F. on the outbreak of hostilities. His home was at Herne Bay, Kent, and he worked East Kent extremely thoroughly. In addition he collected Lepidoptera all over the British Isles, and his regular contributions to the pages of the "Entomologist's Record" will be missed by its readers.

In addition, two members died during the year.

Mr Russell James was a Fellow of the Royal Entomological Society, and joined our Society in 1924. He possessed a very fine collection of Lepidoptera and often contributed notes of interest to the magazines.

Dr H. G. Harris, B.S. (Durham), of Southampton, died about three months ago. He was particularly interested in the Rhopalocera of Great Britain, France and Switzerland, especially in local forms, races, varieties and aberrations, and made periodic collecting trips abroad. He was a member of the Society of British Entomology, and often acted as host to his fellow members.

I should also like to mention Captain B. S. Curwen, of Twickenham, who died on 4th January, and who was a member of the Society from 1928 to 1936. He was particularly interested in European Lepidoptera and had a fine collection. Among his captures was a remarkable aberration of *Polyommatus (Lycuena) coridon*, Pod., an extreme *radiata* form. This specimen was incorporated in the Bright Bequest, which is now the property of this Society.

I ask you to stand for a few moments as a token of respect for the memories of our departed colleagues.

Among the gifts to the Society, I would like to make special mention of the outstanding present of named varieties of the three species of butterflies so well known to us in our younger days as the Meadow Brown, Gatekeeper and Small Heath, which has been so generously given to us by Mr H. A. Leeds. Some estimate of the nature of the donation can be drawn from the fact that the specimens number about 520.

As no doubt you will have anticipated, I have decided to give my address on the subject of the Microlepidoptera. Owing to the war, I have not been able to specialise in one particular genus, as I should have liked, but will mention species and facts about them which I hope will be of interest even to those who do not at present collect or study the "smaller fry." What I should really like to do is to stir up enough interest to persuade all who now collect Macrolepidoptera to extend their pursuit to include some of the more neglected species such as the *Pyralidina* and *Tortricina*. Once a start is made with such well-known insects as the Mother-of-Pearl, Garden Pebble, etc., it is surprising how quickly interest grows and extends to the *Tortricina* and on to the *Tineina*, even if the smallest in these groups cannot be managed.

Looking back over the many years during which I have collected the Microlepidoptera, I am equally surprised at the number of common species which I have never come across and the many rarer insects which, to me at any rate, are always turning up. I suppose most of us have memories of certain insects which we particularly wanted and which were searched for in vain, till one day, perhaps, a friend has pointed the particular insect out to us in the field, and from that time we have been able to take enough and to spare of what was to us at one time a rarity. This only goes to show that in many cases the term "rarity" is in reality simply an excuse for confessing that we do not

know enough of the life-history of a particular species to be able to take it freely.

Many of the so-called "micros." are anything but microscopic. The *Pyralidina*, for instance, are nearly all larger than the "Pugs," which are embraced in the generally accepted term of the *Macrolepidoptera*. The *Tortricina* also have very few really minute species; while even the *Tineina* include some quite large species—*Orthotaelia sparganella*, Thunb., for instance, with a wing expanse of from 21 to 28 millimetres.

Another point that should draw more interest to the study of the *Microlepidoptera* is the fact that there are still a number of species of which the complete life-history is still unknown, while species new to the British List are discovered every year.

Since Meyrick published his "Revised Handbook" in 1928, quite a number of species have had to be admitted to a place in the British List. In 1935 Mr T. Bainbrigg Fletcher recorded 28 species to be added to our list ("Entomologist's Record," October 1935, pp. 112-4), and there have been a number of additions since.

Until quite recently *Salebria obductella*, Fisch. v. Rösl., was little known in this country, and Meyrick dismisses it with a short note, adding: "Its alleged capture is discredited." A few years ago I was shown a hillside in Kent where the larvae were in abundance on *Marrubium*, the spun-together bunches of leaves being very noticeable.

Myelois cirrigerella, Zinck., is another species which, although still a rarity, has been taken in larger numbers than formerly, now that it is known that the larvae feed on the seed-heads of the Field Scabious (*Knaulia arvensis*).

Meyrick says of *Pyrausta nubilalis*, Hübn.: "Probably a casual immigrant only," but the capture by me of an odd specimen at Benfleet on the occasion of one of our field meetings led to the discovery that it was well established there, the larvae feeding in stems of *Artemisia vulgaris*. As this moth has been taken several times near Sandown in the Isle of Wight, it is highly probable that it will be found to be established there also.

It has always been a cause of wonderment to me how an insect so frail as *Pterophorus carphodactyla*, Hübn., can spread over a large area in a few years. About forty years ago this species was first discovered in Kent and the Isle of Wight. Now it is one of our commonest plumes, and occurs in abundance (among *Inula conyza*) at Eynesford, Kent, and Boxhill, Surrey. I have even found it at Riddlesdown, near Croydon. One of our members has just recently located it near Reading, Berkshire. To me it is fantastic to think that it was overlooked by the old collectors, especially at a place like Boxhill, which was so well worked even in Stainton's day.

Another species which has spread with even greater rapidity is the *Tortrix*, *Cacoecia pronubana*, Hübn., which was first noticed (at Bognor, I think) in 1903, but is now one of the commonest of moths in the London area, especially around the privet hedges of suburban gardens.

This species is not exactly a fragile insect, like the one previously mentioned, and is remarkable for the polyphagous nature of the larvae. In my own garden I have even found them feeding on *Antirrhinum* and *Aquilegia*.

It gave me great pleasure a few years ago to discover the larvae of *Phalonia gilvicomana*, Zeller, in Surrey, and I feel sure that this species is much more widely distributed than one would suppose from the few records of its capture. It feeds on the seeds of the Wall Lettuce (*Lactuca muralis*), and a search—where this plant is common—for the larvae in July should produce more records in fresh districts.

There is a note by the late Prof. Waters about this species which has interested me. He says: “. . . two *Phaloniids* from the Spilisbury collection, which have long served as examples of *gilvicomana* in the Hope Department of the Oxford University Museum, are clearly another closely-allied (and still prettier) species; but they bear no data, and their history is unknown” (“E.M.M.,” 1925, p. 18). If this species could be identified from a continental collection, and the foodplant mentioned, it is possible that others would be discovered, although, of course, they may be actually of continental origin.

Lactuca muralis is also the foodplant of *Pselnophorus brachydactyla*, Treits., a fine Plume moth which has only been found in recent years by Mr Bainbrigge Fletcher near Stroud, Gloucestershire. Early records give Norfolk, Cumberland, and Perth, and it seems likely that if entomologists were more familiar with the foodplant, the known range of this interesting species would be extended.

The foodplant of *Pyrausta cingulata*, Linn., has always been a puzzle to me. Meyrick gives *Salvia pratensis*, but according to my book on botany, this plant grows from two to four feet high, and I have never seen any plant as conspicuous as this must be growing on the bare exposed slopes frequented by this moth. It occurs at Boxhill, but is very local compared with its common congener *P. nigrata*. In the Isle of Wight I have taken *P. cingulata* on Freshwater Down, but strangely enough *P. nigrata* has never been taken in the Island.

Speaking from experience, I should like to mention how difficult it is to locate and identify our more rare plants on which some of our local species feed. For several years now I have been trying to find *Thesium linophyllum* (the Bastard Toadflax). We have a very interesting species attached to this plant, namely, *Epermenia insecurella*, Staint., which was first discovered at Coulsdon, Surrey, in Stainton's day. Recent records of the moth are few (if any), but old records give the Isle of Wight and Wiltshire. According to botanists, this plant is of frequent occurrence on the chalk downs, and I am hoping one of these days to discover it or to have it pointed out to me.

While on the subject of local foodplants, I would like to mention the Tortrix *Laspeyresia pallifrontana*, Zell., the larva of which feeds in the pods of the Milk Vetch (*Astragalus glycyphyllos*). I have grown this plant from seed supplied by a friend some years ago, and it is a most

distinct plant, growing almost bush-like. This Vetch is recorded from various parts of Surrey—"on hills to the north of Merstham" being given by one authority. However, I have been unable to find the plant. Darenth Wood is an old locality for it, and the latest record I have seen of the occurrence of the larvae was some years ago along the Hogs Back, Surrey.

Then there is *Argyroploce penthiana*, Guen., with a larva feeding in stems of *Impatiens noli-me-tangere*. This is evidently a northern plant, the records being from Lancashire and Westmorland. It might be of interest to mention that of the four species of Balsam mentioned in the books, the other three all occur locally common in Surrey. *Impatiens biflora* is to be found on the canal bank at Byfleet, while *I. parviflora* and *I. glandulifera* are to be seen at Boxhill, the former at the railway station and the latter along the banks of the River Mole.

Another species with an apparently little-known foodplant is *Scythris cicadella*, Zell., the larva of which feeds in sand-tubes amongst stems and roots of *Scleranthus perennis*, according to Meyrick, and occurs from Surrey to Suffolk. The "sand-tubes" give a good clue as to the nature of the soil on which to search.

When browsing through the periodicals of thirty or forty years ago—and very interesting reading-matter is to be found amongst them—one is struck by the large number of species taken then of which recent records are very meagre, if indeed there are any at all. Are these species really extinct now in this country? There is a possibility that one or two have died out, but I have no doubt that the majority are still hanging on in some out-of-the-way corner and will be re-discovered by diligent collectors in the years to come. I hope that, when the war is over and conditions permit, more collecting of micros at light will be attempted, as I believe the possibilities in this field have been rather neglected in the past.

In the old days when Chattenden in North Kent was such a magnet to the old-time collectors, the plume moth, *Platyptilia rhododactyla*, Fabr., was frequently taken there. The larva feeds on the shoots of the Dog Rose, and has also occurred in Essex and Middlesex. The railway bank near Mill Hill Station, in Middlesex, was one of its most recent haunts, and I believe the latest records come from that county. It may still be taken by entomologists, but as far as I know there are no printed records of its capture for some years.

I would like to mention here the mix-up there has been over the Tortrices, *Pammene juliana*, Curt., and *P. nimbana*, Herr.-Schäff. Meyrick gives the latter as synonymous with *juliana*, but the late Mr Thurnall used to write about *nimbana* forty years ago, and knew it well. Mr F. N. Pierce was unable to find a specimen of *nimbana* to figure in his book on the genitalia, and there were none left in the Thurnall Collection. In Vines' Collection the male was *Laspeyresia grossana*, Haw., while the female under the name of *nimbana* was *P. juliana*. Mr L. T. Ford has a fine series of *nimbana* and anyone who has seen these would

realize that it is quite distinct from *juliana*. The larvae of *nimbana* feed in beechnuts, while those of *juliana* attack acorns, the former being an earlier insect.

There is a very old record of *Laspeyresia corollana*, Hübn., having occurred at Whittlesea Mere. The larva feeds in a similar manner to *L. servillana*, Dup., which inhabits a swelling in the shoots of willow, but *corollana* is on aspen instead of willow. Imagines of *L. servillana* are seldom seen, but the small swollen twigs containing the larvae may be obtained by diligent search, and it seems likely that *corollana* would be found again if a good search was made among aspen at Whittlesea Mere by someone who was familiar with the feeding habit of *servillana* and knew what to look for.

Just previous to the war, when Italian peaches could be bought very cheaply on the stalls in the London streets, I bred a few specimens of *Laspeyresia molesta*, Busck, from fruit which had been attacked by the larva. This moth, called the Oriental Peach Moth, is spreading all over the world, from the Mediterranean to Japan and the Argentine. It is not confined to peaches, and causes severe damage in the orchards by eating the shoots of apple, pear, etc. Fortunately it has not yet been recorded as breeding in this country except from imported fruit.

Among the *Tineina* I have selected a few which I should like to mention. One of our most local moths is *Metzneria littorella*, Dougl., which is seemingly only to be found in this country in a few fields near the southern extremity of the Isle of Wight. It is attached to the Buck's Horn Plantain (*Plantago coronopus*), in the stems of which the larva feeds. The moth can usually be bred in abundance from old flowering stems collected in early spring.

Some years ago *Mesophleps silacella*, Hübn., was discovered near Brighton, and numbers seem to have been bred from larvae feeding in seed-capsules of *Helianthemum*. This is a fair sized species with pale yellow-ochreous forewings, and should be discovered again by diligent search, although I (and others) have so far failed in the attempt.

Schiffermuelleria woodiella, Curt., is a name known to all students of microlepidoptera. It is the species with such a romantic history which used to occur in numbers near Manchester but has not been seen for nearly a century, and the only specimen left in this country, as far as I know, is now in the collection of the British Museum.* It may not be so often realized that there are four other species in this genus, all of which are of rare occurrence. *S. formosella*, Fabr., used to be taken in old orchards in Essex, but I think *S. grandis*, Desv., a beautiful insect, has the most recent records. All this genus have larvae feeding in decayed wood.

Another rare moth is *Aploa palpella*, Haw. ("E.M.M.," 1891, p. 271), which has very noticeable palpi. The larvae feed gregariously in

*NOTE.—Mr S. Stringer of the B.M. (Nat. Hist.) informs me that there is another specimen which he had seen in the Manchester University Museum. Curtis' type is in the Museum at Melbourne, Australia.—C. N. H.

moss on tree-trunks or walls, but records of its appearance are few and far between.

What has happened to the finely marked yellow and red *Hypocallia christiannana*, Linn., in these days? It is attached to *Polygala* (Milk-wort), and used to be taken at Kemsing in Kent, but is now considered by many to be extinct in Britain. Personally I incline to the view that it will be re-discovered one of these days.

The genus *Depressaria* numbers among its forty odd species some of our commonest and rarest species. I would like to mention one—*D. bipunctosa*, Curt.—which is given as synonymous with *D. liturella*, Schiff., by Meyrick. Banks considered *bipunctosa* “certainly distinct from all its allies” (Morey’s “Guide to the Nat. Hist. of the I.W.,” p. 433). There is work to be done here by some entomologist with the opportunity of studying these—if Banks is right—two species.

There are really very few Lepidoptera with gall-making larvae, but *Augasma aeratellum*, Zell. (“E.M.M.,” 1895, p. 132; 1896, p. 64) is a true gall-maker. The pod-like galls are made among the flowers of Knotgrass (*Polygonum aviculare*), and should be looked for from August onwards. This is one of our rarest species. As the larvae inhabit the galls all through the winter, eventually pupating within them, it will be realized that cultivation tends to destroy them, which may account for so many fruitless searches for this species where the foodplant is abundant—invariably on cultivated ground. Disused quarries and cliff-sides seem to be the most promising places to look, as artificial cultivation is absent here and yet the natural falls of the soil give a semblance to tilled ground, and the Knotgrass certainly thrives under such conditions. As is the case with several other species which feed in exposed positions, it has been noticed that the moths fail to emerge unless the galls are placed in a certain amount of sunshine.

I suppose most of us are familiar with the moth sometimes known as the Small Ermine (*Hyponomeuta cognatella*, Hübn.), the larvae of which makes such unsightly webs on the garden Euonymus, but there is, or was, also another species feeding on this shrub, and which used to occur in the London suburbs. I refer to *H. irrorella*, Hübn., no specimen of which has been noted for many years.

In 1937, a specimen of *Ethmia sexpunctella*, Hübn., was recorded at light from Dungeness, Kent (“Entom.,” September 1937, p. 210). This species, together with *E. bipunctella*, Fabr., is attached to the Vipers Bugloss (*Echium vulgare*), and belongs to a genus of which the imagines are seldom seen, in spite of their comparatively large size and showy white and black markings. Others of the genus are attached to *Thalictrum*, *Lithospermum* (Gromwell), *Symphytum* (Comfrey), and *Pulmonaria* (Lungwort)—all rather unusual foodplants.

I should like to mention here the recent re-discovery of *Acrocercops imperialella*, Mann., in Hampshire, by one of our new members, Mr S. C. S. Brown, of Bournemouth. The larvae were found feeding in the

leaves of Lungwort. This is one of our smaller species, and it is also reputed to feed on Comfrey.

A few years ago I was given a small larva feeding under a slight web on a banana. This specimen was new to Science, and given the name of *Opogona antistacta* by Meyrick. There are a number of species in this genus, including *O. subcervinella*, Walk., most of them feeding on bananas. The latter has occurred several times in this country, and the late Mr Tonge gave me a specimen which he had bred himself.

Another species I should like to mention is *Myrmecozela ochraceella*, Tengst. This remarkable moth lives in the nests of *Formica rufa*, the Wood Ant, and has been found in Perthshire. As the Wood Ant is widely distributed in Britain, it seems rather a mystery why this moth should not occur further south. It has been recorded that a variety of *F. rufa* occurs in Perthshire—var. *alpina*, I think it is called. It would be interesting to know if the moth occurs with this variety, and if so, whether it has a preference for its company, or is even—in Britain at any rate—solely attached to this variety. If so, this would explain its non-occurrence further south.

There are two very recent discoveries which I want to mention here. First, a hitherto undescribed species found by Messrs Fassnidge and L. T. Ford on a salt marsh near Southampton. This has been named *Psamathocrita argentella* by Messrs Pierce and Metcalfe ("Entom.," December 1942), who state that it is closely allied to *P. ossella*, Staint.

Then there is the species *Acedes (Tinea) piercella*, Benck. ("Entomologist's Record," January and February, 1943), an insect discovered on the Continent in recent years, but not hitherto found in Britain. This moth was reared by me this last season from a bird's nest found in the hollow branch of an Ash tree in my garden at Norwood. It is closely allied to *A. fuscipunctella*, one of our indoor clothes moths.

These notes have lightly touched on some of the species which have particular interest for me—in most cases because I have never taken specimens myself. It has been my aim to try to show what a lot is still to be discovered about the life-histories and habitats of these more neglected species of our Lepidoptera—usually misnamed the Microlepidoptera.

I should like to add that the most interesting and profitable way of collecting the smaller moths is to rear them. They may often be taken in numbers in a restricted locality by knowing the foodplant and searching for the larvae. The capture of an odd faded specimen of a local species often leads to one being able to obtain a good series by breeding, and specimens obtained in this way well repay for the trouble taken.

This brings me to the end of my talk to-night on Microlepidoptera.

I should now like to express my sincere thanks to the officers and members of the Council for the help and support they have given me during my presidency. Particularly would I like to thank Mr Coote for deputising for me at the Thursday evening meetings which I was unable to attend, and also Mr Stanley-Smith, our indefatigable Secretary, upon whose help I could always rely.

It now remains for me to welcome our new President, Mr R. J. Burton. Tradition prescribes that I should introduce him, but to most of you here to-night he needs no introduction; all field-meeting members in particular will know him as a keen collector of Macro-lepidoptera. A few years ago he had the unique distinction of having two children as fellow-members. His zeal for everything that concerns the welfare of the Society was particularly appreciated by the Council when they nominated him to the high office to which you have now elected him. May his term of office be as easy and pleasant as mine has been.

Mr Burton, the President elect, was then inducted to the Chair. After thanking the Society for the honour they had conferred upon him he proposed a vote of thanks to Mr Wakely for his Address and asked permission for it to be printed in the forthcoming "Proceedings." Mr Wakely replied and assented to the proposal.

Votes of thanks were then proposed to the Treasurer, Secretaries (including Mr Denvil), the other Officers and Council, the Auditors and the other officials. Suitable replies were made by or on behalf of the recipients.—S. WAKELY (*President*).

RECORDS AND FULL DESCRIPTIONS OF VARIETIES AND ABERRATIONS.

Exhibited at the Annual Exhibition of the South London Entomological and Natural History Society (October 1942).

Compiled by S. G. CASTLE RUSSELL and H. J. TURNER for publication in the *Entomologist's Record* and in the *Proceedings* of the Society.

MR B. W. ADKIN exhibited:—1. *Argynnis paphia*, L., gynandromorph; C. Gulliver, New Forest, 1918. 2. *Argynnis paphia*, L., cream-coloured ♂; A. Ford, New Forest, 1919. 3. *Argynnis paphia*, L., ab. *melaina*, D'Aldin, ♂♂ and ♀♀; bred, L. W. Newman, New Forest, 1908.

1. *Argynnis cydippe*, L., banded ♂; C. Gulliver, New Forest, 1929. 2. *Argynnis cydippe*, L., lightly-marked ♂ with rayed hindwings; T. E. Hubbard, New Forest, 1926. 3. *Argynnis cydippe*, L., ab. *bronzeus*, Frohawk, ♀; B. W. Adkin, Windsor Forest, 1928. 4. *Argynnis cydippe*, L., strongly-marked ♀; B. W. Adkin, Sussex, 1942.

1. *Argynnis aglaia*, L., a melanic ♀; H. G. Heath, Swanage, 1920. 2. *Argynnis aglaia*, L., heavily-marked ♂; E. P. Sharpe, Eastbourne, 1913. 3. *Argynnis aglaia*, L., yellow ♀; J. H. Longhurst, Swanage, 1922. 4. *Argynnis aglaia*, L., large ♀; B. W. Adkin, N. Kent, 1942.

MR H. W. ANDREWS exhibited the following Diptera:—(a) An exhibit showing wing marking variation in *Urophora stylata*, Fb. (*Trypetidae*). (b) An exhibit showing varieties of *Merodon equestris*, Fb., the "Narcissus-fly."

MR S. R. ASHBY.—Four drawers of British Coleoptera containing the families:—*Lucanidae*, *Scarabaeidae*, *Buprestidae*, *Elateridae*, and part of *Chrysomelidae*. The SCARABAEIDAE included the genera *Copris*, *Onthophagus*, *Aphodius*, *Heptaulacus*, *Saprosites*, *Oxyomus*, *Psammobius*, *Aegialia*, *Odontaeus*, *Geotrupes*, *Trox*, *Hoplia*, *Homaloptia*, *Serica*, *Amphimallus*, *Melolontha*, *Phyllopertha*, *Anomala*, *Cetonia*, *Potosia*, *Gnorimus* and *Trichius*. The BUPRESTIDAE included the genera *Melanophila*, *Anthaxia*, *Aphanisticus*, *Trachys*, the five species of *Agrius*. The ELATERIDAE, the genera *Lacon*, *Cardiophorus*, *Hypnoidus*, *Cryptohypnus*, *Elater*, *Ischnodes*, *Procræus*, *Melanotus*, *Harminius*, *Athous*, *Limoniæ*, *Sericus*, *Adrastus*, *Agriotes*, *Dolopius*, *Corymbites* and *Prosternon*. The CHRYSOMELIDAE: Genera, *Labidostomis*, *Clytra*, *Gynandrophthalma*, *Cryptocephalus*, *Lamprosoma*, *Timarcha*, *Chrysomela* and *Melasoma*.

MR V. E. AUGUST exhibited the following:—A melanic form of *Pararge aegeria*, L.; two aberrations of *Argynnis* (*Brenthis*) *euphrosyne*, L.; *Limenitis camilla*, L., ab. *nigrina*, Weym.; *Apatura iris*, L.;

Acronicta (Apatele) alni, L.; *Erynnis tages*, L., all from N.W. Sussex. *Lycaena arion*, L., from N. Cornwall, and a series of *Euchloris smaragdaria*, Fb., bred from ova found during a Field Meeting at Benfleet.

MR T. L. BARNETT exhibited:—*Argynnis paphia*, L., a gynandromorph, left side ♀, right side ♂, Sussex 1942. *Cocconympha pamphilus*, L.: Several with small apical spot, one ♂ with very dark underside, brownish black, one from Kemsing, Kent, with four very small spots on upperside hindwings. A series of *Ematurga atomaria*, L., with pale yellow ground colour and many dark specimens. A series of *Sterrhia (Hyria) muricata*, Hufn., from Wicken and Witherslack.

CAPTAIN E. S. A. BAYNES exhibited a few species taken or bred in 1942, including a ♀ *Hyloicus pinastri*, L., bred from Dorset; *Pyrria umbra*, Hufn., bred from Surrey larvae; *Boarmia ribeata*, Clrck. (*abietaria*, Schiff.), a dark form from larvae taken on yew on the Hog's Back; *C. jacobaeae*, L., with the upper marginal spot joining the costal stripe, from W. Surrey; a specimen of the *nigrosparata*, Rayn., form of *Abraxas grossulariata*, L., bred from a pupa taken wild in Herefordshire. Also a selection of Lepidoptera taken on the Hog's Back, near Guildford, including *Hamearis lucina*, L., *Cupido minimus*, Fussli., *Polyommatus (L.) coridon*, Poda, ab. *i-nigrum*, Tutt, and ab. *arenata*, Wheel., *P. (L.) bellargus*, Rott., *Drymonia trimacula*, Esp., *Stauropus fagi*, L., *Lithosia (Eilema) complana*, L., *L. (E.) deplana*, Esp., *Pulimpsestis ocularis*, Gn. (*octogesima*, Hb.), *Mamestra (Apamea) sordida*, Bork. (*anceps*, Hb.), *Agrotis cinerea*, Hb., *Harmodia nana*, Hufn. (*conspersa*, Esp.), *Meristis trigrammica*, Hufn., ab. *obscura*, *Laphygma exigua*, Hb., *Orthosia (Taeniocampa) gracilis*, Fb., *O. (T.) munda*, Schiff., ab. *immaculata*, Stdgr., *Cosmia pyralina*, View., *C. diffinis*, L., *Plastenis subtusa*, Fb., *Cirrhia citrigo*, L., *Xanthia aurago*, Fb., *Xylina semi-brunnea*, Haw., *X. socia*, Rott., *Eustrotia uncula*, Clrck., *Plusia festucae*, L., *Arentia (Laspeyria) flexula*, Schiff., *Hemistola chrysoprasaria*, Esp. (*vernaria*, Hb.), *Cosymbia annulata*, Schlitz., *Thera juniperata*, L., *Eupithecia pimpinellata*, Hb. (*denotata*, Gn.), *E. haworthiata*, Dbldy., *Plagodis dolabraria*, L., *Erannis defoliaria*, Clrck., ab. *obscurata*, Stdgr., *Boarmia ribeata*, Clrck. (*abietaria*, Schiff.), *B. roboraria*, Schiff., *Synanthedon andrenaeformis*, Lasp., *S. flaviventris*, Stdgr., etc.

MR L. BIRCH.—An example of *Argynnis paphia*, L., ab. *confluens*, ♀, Splr., and ab. *melaina*, ♀, both from Wyre Forest, 1942. *Argynnis cydippe*, L., a ♂ with the two forewings greatly extended in large hooks, with the centre of each extension filled with a long black bar. The hindwings are black with a series of buff lunules at the bases. Wyre Forest, 1942.

MR A. A. W. BUCKSTONE exhibited:—*Argynnis cydippe*, L.—A buff-coloured ♂; two ♂♂ with pronounced black markings; a ♂ underside having the brown of the lunules of hindwings replaced by blue green,

and the brown spots between veins 3, 4, and 5 of right wing wanting. All Ashtead, 1942. *Gonepteryx rhamni*, L.—A ♂ with red scales situated between base of right forewing and central spot. Fetcham, Surrey, September 1942. *Aglais urticae*, L.—Specimens captured or bred from wild Surrey larvae, including several ab. *polaris*, Stdgr. (*pseudoconnexa*, Cabeau), two ♂♂ approaching ab. *leodiensis*, Cabeau, two ♂♂ with the typical reddish orange colour replaced by pink and several specimens of very dark colour. *Callimorpha (Hypocrita) jacobaeae*, L.—A dark smoky specimen. Dorking, 1942. Three underside forms, one with band of hindwings very pale, almost white, and with a yellow spot in black area. Two with yellow line running through black area. *Arctia villica*, L.—Living larvae, pupae and imago of second broods. Dated records are:—June 5—About 150 eggs deposited; June 18 to 25—130 larvae emerged; July 17—Many underwent first moult; September—Larvae commenced spinning up; October 10—About half the larvae had now spun up, the remainder being in either their fourth or fifth (last) instar. The hair is black until after the last moult, when it rapidly turns brown.

MR A. BLISS.—From West Sussex *Apatura iris*, L., *Hemaris fuciformis*, L., *H. tityus*, L., *Psilura (Lymantria) monacha*, L., *Procris (Ino) statices*, L., and confluent *Zygaena trifolii*, Esp., *Gastropacha quercifolia*, L., from Bookham; *Polyplocia ridens*, Fb., from Ashtead; and *Cucullia verbasci*, L., from Purley.

MR J. H. BELL and MR P. J. BELL exhibited:—(1) An aberration of *Plusia gamma*, L., in which the "silver Y" is much extended into an irregular blotch. Dr Cockayne pointed out the remarkable similarity to the figure of *P. pulchrina*, Haw., in the "Entomologist," 1920, vol. 53, pp. 1-2, text figure of a specimen taken in Gloucestershire in 1919, now in the Rothschild Collection, Tring. (This specimen was sent up for comparison and exhibition.) (2) A dark banded form of *Selidosema plumaria*, Schiff., from the New Forest, August 1936. (3) Three *Nymphalis (Vanessa) io*, L., one ab. *belisarius*, Frwk., from Lee, Devon; two others with almost complete absence of purple on the ocelli. (4) A series of *Heodes phlaeas*, L., showing rayed spotting, mainly from Berkhamsted, with ab. *alba*, ab. *intermedia*, and rayed forms. (5) A *Satyrus (Melanargia) galathea*, L., with markings of the hindwings almost absent; Swanage, 1931. (6) A series of very small *Xanthorhoe fluctuata*, L., with considerable deficiency of marking. (7) Extreme abs. of *Epirrhoe alternata*, Müll. (*sociata*, Bork.), one with only a dot in the centre of the forewings and some shading on the margins. (8) *Argynnis (Brenthis) euphrosyne*, L., showing more or less increase of dark marking, one being extreme.

DR G. V. BULL exhibited *Acherontia (Manduca) atropos*, L., from Kent, 1941; two banded *Diaphora (Spilosoma) lutea*, Hufn. (*lubricipeda*, L. in pt.), bred by S. Wakely; *Arctia villica*, L., with smoky hindwings, N.E. Sussex; *Pieris rapae*, L., with spots united by black scal-

ing, Sandhurst, Kent; *Parasemia plantaginis*, L., bred in September, August and October from ova laid on 10th June 1942 and some bred in October 1933 from ova laid 10th June 1933. Also a centipede and its prey, *Noctua (Amathes) xanthographa*, L., taken at sugar. The abdomen of the moth was almost completely eviscerated.

COL. V. R. BURKHARDT.—A ♂ *Argynnis cydippe*, L., of pale lemon colouring on all wings, New Forest, 1942. *Argynnis paphia*, L.—An extreme ♀ form of ab. *melaina*, D'Aldin, almost entirely black, another very similar, and a male form of ab. *confluens*, Spul. *Limenitis camilla*, L.—An unusual form of ab. *semi-nigrina*, Frwk., all New Forest. *Argynnis (Brenthis) selene*, L.—A melanic form of ♀ with a series of bars on the outer margins of forewings, the central areas being black and spotless; hindwings deep black; New Forest, 1942.

MR S. A. CHARTRES exhibited aberrations of *Polyommatus (Lysandra) coridon*, Poda, *P. bellargus*, Rott., and *Melitaea athalia*, Rott., taken by exhibitor in East Sussex, 1942, including the following:—*Lysandra coridon*, Poda.—A ♂ with right wings, *obsoleta*, Tutt, ground colour slate grey, and smaller than left wings, which are normal. A ♂ upperside, all wings suffused with black, ab. *atrescens-suffusa*. A ♀ ab. *glomerata*, Tutt, heavily marked. A ♀ very heavily marked. A ♀, the orange spots on left hindwing extended into dashes on both upper and underside; on the left forewing is a blue-white blotch. A ♂, the left hindwing of which is about a third larger than the right, and square shaped. It has the markings of three separate wings, i.e., three discoidal spots (full size). The outer margin has three times the normal number of spots and the other spots on wing are doubled; the other wings are normal. *Lysandra bellargus*, Rott.—An ab. *radiata*, Tutt, three wings heavily radiated, the fourth being ab. *digitata*, Courv. An example with the hindwings only radiated. *Melitaea athalia*, Rott.—A ♀ with the dark bands and spots on all wings missing.

MR F. D. COOTE exhibited a heavily-marked *Argynnis cydippe*, L., from Ashted, and *Limenitis camilla*, L., ab. *semi-nigrina*, Fwk., from Sanderstead, 30.7.42.

MR B. H. CRABTREE exhibited, on behalf of MR A. E. TONGE, aberrations of *Arctia caja*, L., and, on his own behalf, two *Acrionicta (Apatele) leporina*, L., both very dark; they were two years in pupa; another specimen, also dark, was three years in pupa. The larvae came from the neighbourhood of Manchester. Also two *Notodonta dromedarius*, L., very dark, from Alderley Edge larvae.

MR A. W. DENNIS exhibited specimens of *Metachrostis (Bryophila) perla*, Fb., and of *Spilosoma lubricipeda*, L. (*menthastri*, Esp.), from a garden in Dalston, showing considerable variation.

MR J. DEAL exhibited a variable series of *Lycia hirtaria*, Clrck., from a ♀ taken at West Wickham; they emerged in April 1942. *Strymon w-album*, Knoch., an underside aberration, a number of which were

bred from larvae taken at Shoreham last Spring. *Lysandra coridon*, Poda, a series taken at Swanage, 1937/8, including ab. *alba*, Tutt, ab. *striata*, Tutt, ab. *caeca* and *post-caeca*, and ab. *fowleri*, South. *Argynnis cydippe*, L., an upperside aberration similar to one in Frohawk's "British Butterflies," taken at Ashted Field Meeting, July 1942.

MR T. R. EAGLES exhibited a small collection of British moths collected about the year 1860, including a specimen of *Deilephila (Celerio) galii*, Rott.

MR W. J. FINNIGAN exhibited a number of his Lantern Slides of Natural History Subjects, including *Clostera (Pygaera) curtula*, L., *Theretra porcellus*, L., with larva, *Phalera bucephala*, L., *Limenitis camilla*, L., *Abraxas sylvata*, Scop., with larva, *Ectropis bistortata*, Göze., and *Lomaspilis marginata*, L. The plants Butterwort, *Pinguicula vulgaris*, L.; Chickweed Wintergreen, *Trientalis conopsea*, L.; Small Teasel, *Dipsacus pilosus*, L.; Clustered Bellflower, *Campanula glomerata*, L.; and Bog Pimpernel, *Anagallis tenella*, L. The Fungi *Lepiota racodas*, Vitt., *L. procera*, Scop., and *Geoglossum glutinosum*, Pers. The Canal at Weybridge.

MR L. T. FORD exhibited the following Microlepidoptera:—*Cnephasia bellana*, Curt., Warton Crag, 29.6.41; *Argyroploce rufina*, Scop., Witherslack, 13.7.41; *Scythris fallacella*, Schläg., Witherslack, 26.5.40; *Lampronia pubicornis*, Haw., Arnside, 17.6.41; *Crambus fassellus*, Schiff., Grange, July 1940; *Blastobasis lignea*, Wlsm., Arnside. August 1941.

MR F. W. FROHAWK exhibited:—*Pieris brassicae*, ab. *nigronota*, Fwk., five specimens, four with black marginal streaks on upper part of outer margins of hindwings—a new form of aberration; all bred from Sussex ova, August 1941. *Erebia aethiops*, Esp., with median band missing on underside of hindwings; Galloway, August 1941. *Coenonympha pamphilus*, L., one with ocellus entirely missing on one wing, the other largely developed on corresponding wing, also a particularly large ♀ with black margins to hindwings; Galloway, August 1941. *Aglais urticae*, L. Three abs. *nigra*, Tutt, and *semi-nigra*, Fwk., captured by Captain E. B. Purefoy, East Farleigh, Kent, 1936, 1939, 1942.

MR A. L. GOODSON exhibited a variety of *Hemistola chrysoprasaria*, Esp. (*vernaria*, Hb.), in which the ante- and post-median transverse lines of the forewings were widened and fused into a whitish patch, leaving a triangular mark on the costa; also other species recently taken.

MR F. T. GRANT exhibited series of the following species of Coleoptera taken about mid-day, Greenwich time, running on the trunk of a decayed hornbeam in Cobham Park, 6.vi.42:—Series of *Melandrya*

caraboides, L., and *Leptura scutellata*, Fb., and also on the same trunk, 18.vi.42, a series of *Ptilinus pectinicornis*, L.

MR H. HAYNES exhibited:—*Argynnis paphia*, L.—A series of 36 specimens taken in the New Forest, mostly in 1919, including four ♂♂ and five ♀♀ ab. *confluens*, Spul. Five ♂♂ and one ♀ ab. *melaina*, D'Aldin, one being an extreme black-rayed form; also a ♂ and ♀ with markings on the forewings, ab. *glomerata*, Tutt. *Polyommatus* (*Lysandra*) *coridon*, Poda, taken in the Salisbury district during recent seasons, including ab. *pulla*, ab. *fowleri* and ♂♂ with heavily-marked borders, many underside forms, including *caeca* and other extreme forms, and several ♂♂ with striated forewings (ab. *digitata*, Courv.). Also three ab. *albescens*, Ckll., and an almost symmetrical gynandromorph. *Polyommatus* (*Lysandra*) *bellargus*, Rott., a series from the Salisbury district, showing *obsoleta* and *radiata* aberrations. *Polyommatus icarus*, Rott., a lavender-coloured ♂ and an extreme *obsoleta* ♂ with white background; both from Salisbury district. *Plebeius aegon*, Schiff., a ♂ underside ab. *caeca*, New Forest, 1942. *Panaxia* (*Callimorpha*) *dominula*, L., a series from the Salisbury district showing specimens with enlarged and confluent markings in forewings. Also a series of ab. *bimacula*, including some extreme examples bred from the Oxford strain.

MR I. R. P. HESLOP exhibited the following aberrations of British Rhopalocera:—A *Papilio machaon*, L., a ♀ with slightly striated forewings; a *Pieris rapae*, L., the exhibitor's first butterfly, taken on 20th March 1913; 2 *Colias hyale*, L., an exceptionally small ♂ and a large ♀; 2 *Argynnis cydippe*, L. (*adippe*, L.), an abnormally pale ♀ (1942) and a normal ♀; 2 *A. paphia*, L., a ♂ var. *confluens* and a ♀ (1942) var. *confluens*; a *Brenthis euphrosyne*, L., with smoky diffusion on upper forewings; a *Euphydryas aurinia*, Rott., with the forewings clouded; a *Melitaea athalia*, Rott., very lightly marked; 2 *Vanessa cardui*, L., a very pale ♀, and a very large dark richly-coloured ♀ with an additional apical white spot and blue lunules to the black spots on the hindwing; 2 *Eumenis semele*, L., a very pale pair from the western limestone; 2 *Maniola jurtina*, L. (*janira*, L.), two bleached ♂♂; *M. tithonus*, L., albino ♂; 4 *Chrysophanus dispar*, Haw., a pair of the old-English and a pair of the introduced *batarus*, Ril.; 2 *Lycaena arion*, L., a ♀ from Gloucestershire and a ♀ from Cornwall, showing the characteristic difference; a *Carterocephalus palaemon*, Pall., black markings of forewings much reduced.

CAPT. R. A. JACKSON, R.N., exhibited:—*Ruralis betulae*, L., ♂♂ bred from damson foodplant, one having pronounced fulvous spotting on forewings. *Coenonympha pamphilus*, L., a very pale ♂ from Troödos. *Heodes phlaeas*, L., a ♂ with asymmetrical spotting, right forewing with spots at anal angle missing. A series of *Synanthedon spheciiformis*, Schiff. Pairs of *Sphecia crabroniformis*, Lewin, *S. andrenae*-

formis, Lasp., *S. culiciformis*, L., *S. vespiformis*, Lasp., *S. flaviventris*, Stdgr., and *S. tipuliformis*, Clrk.; all from Bishop's Waltham. A buff form of ♂ *Eilema deplana*, Esp., with typical ♀ for comparison. *E. (Lithosia) griseola*, Hbn., typical, and var. *flava*, Haw., for comparison. A short series of *Gnophos obscurata*, Schiff., from New Forest and Eastbourne. A bred series of *Boarmia ribeata*, Clrk. (*abietaria*, Schiff.), fed on yew; Bishop's Waltham. A case showing pupa-cases of *Aegeriidae*. Two *Abraxas grossulariata*, L., one with heavy black markings, the other a ♀ somatic mosaic left wings, normal; right wings, var. *dohrnii*, Koenig. (*lacticolor*, Rayn.). Some fertile ova were obtained and eight larvae were now feeding; from Dawlish, 1942. This was perhaps the most remarkable insect in the room.

COLONEL S. H. KERSHAW.—Lepidoptera from the Isle of Man, 1941-2. *Euchloë cardamines*, L., several ♂♂ with the normal orange tips to forewings replaced by very pale lemon colour; a gynandromorph predominantly ♀ with same pale lemon colouring on forewings. *Argynnis aglaia*, L., a large ♀ almost entirely black. *Pararge megera*, L., a ♂ with very heavy black bands on forewings, June 1942. *Polyommatus icarus*, Rott., an underside ab. *caeca*, August 1942.

MR H. A. LEEDS exhibited:—*Polygonia c-album*, L., ♂ upperside strongly central-banded with black on all wings, and a ♀ upperside with weak outer markings on hindwings and consisting of thin, brown arches extending inwardly from the border. *Polyommatus icarus*, Rott., ♂ underside, ab. *antidiscoelongata*; ♀ uppersides, abs. *postradiosa-atrescens*, containing five heavily scaled bluish veins; and *syngrapha-ultraalbocrenata*. *Adopoea lineola*, Ochs., ♀ upperside, ab. *pallidula* (golden). All 1942 captured. He also exhibited, and presented them to the South London Natural History Society, 222 *Maniöla jurtina*, L., 101 *Maniöla tithonus*, L., and 216 *Coenonympha pamphilus*, L., consisting of typical and aberrational forms, numbered and named, or termed, in accordance with a List (M.S.) of them and other known British forms of these three species, which is being written, and will be handed over to the S.L. Society when completed by him.

THE REV. J. N. MARCON exhibited:—*Limenitis camilla*, L. (*sibilla*, L.), four examples with partial obscuring of the white bands. A ♂ *Argynnis cydippe*, L. (*adippe*, L.), with tendency to become confluent. *A. paphia*, L.—(1) a ♀ with costal markings of forewings banded together; (2) three ♀ ab. *confluens*, Splr., one very extreme; (3) two ♀ ab. *melaina*, D'Aldin; (4) a ♂ extreme ab. *confluens*, Splr.; (5) a mixed gynandrous example, hindwings ♂ has left forewing ♂ with small streak, right forewing 3/5 ab. *valezina*, Esp., colouring extending from the base in an irregular patch to the outer margin, entirely displacing the ♂ androconial markings. *Brenthis (A.) euphrosyne*, L., a banded form, and a ♀ largely black. *Aglaia (V.) urticae*, L., ab. *nigrocana*, Frwk., caught in a cemetery. *Polyommatus (L.) bellargus*, Rott.—(1)

♂ ab. *digitalis*, Courv., forewings; (2) ♂ ditto fore and hindwings; (3) ♂ ditto with reduction on hindwings; (4) ♀ with left forewing strongly radiated. *P. (L.) coridon*, Poda.—(1) ♂ ab. *infra-lavendula*; (2) 2 ♂ ab. *fowleri*, Sth.; (3) 3 ♂ ab. *pulla*; (4) a gynandromorph predominantly ♀.

MESSRS W. E. MINNION and B. S. GOODBAN exhibited a selection of Lepidoptera taken or bred during the season of 1942. A varied series of *Euphydryas aurinia*, Rott., a series of *Diacrisia sannio*, L., a series of *Argynnis (Brenthis) selene*, one having pale blotches on forewings, a series of *Satyrus galathea*, ♀♀ with very yellow undersides. *Macrotylacia rubi*, L., a number of assembled ♂♂. All the above from Rowden, Devon. *Cossus cossus*, L., taken at light, Rowden. All above were collected by Mr Minnion during "off" periods from active service. Series of the following species were also shown:—*Phragmatobia fuliginosa*, L., bred from a Rowden ♀; *Xanthorhoe spadicearia*, Schiff.; *X. quadrifasiata*, Clrck., Wendover; *Coremia unidentaria*, Haw., from Bucks ova; *Horisme vitalbata*, Schiff., bred from a pair taken at Horsley Field Meeting; *Zygaena filipendulae*, L., three confluent forms, Wendover, Bucks; *Plusia pulchrina*, Haw., and a ♂ *Herse convolvuli*, L., both taken at St Giles, Bucks; *Strymon w-album*, L., Chalfont Field Meeting; *Bena bicolorana*, Fuess., bred from larvae taken at Ruislip; *Synanthedon (Sesia) flaviventris*, from larvae taken at Effingham Field Meeting; and *Pseudopanthera macularia*, L., one having pale ground colour.

MR H. MOORE exhibited two species of grass Mantids from India and the U.S.A., examples of "Slimming" carried to excess.

MR B. M. MORLEY exhibited:—*P. (L.) bellargus*, Rott., from Folkestone—(1) 2 ♂♂ pale (*excelsia*); (2) 2 ♀♀ blue (*semi-ceronus*). *P. (L.) coridon*, Poda.—23 aberrations, including 2 dark ♂♂ (*pulla-suffusa*), 1 ♂ underside (*albescens-obsolata*), 8 ♀ undersides (*nubila*, to *ultranubila-fulvescens*), a ♀ underside (*post-caeca*). *Aglais urticae*, L., ♂ with right hindwing grey. *Boarmia rhomboidaria*, Schiff., 3 black ab. *rebeli*, Aign. A long series of bred *Abraxas grossulariata*, L., showing many aberrations.

MR and MRS P. NAGLE exhibited an aberration of *Argynnis cydippe*, L., New Forest, 1942. The forewings are much suffused with black, especially in the central and outer areas. The hindwings are practically normal but slightly suffused in basal areas. On the underside the forewings show much darker markings than usual. *Maniola jurtina*, L., a ♂ ab. with large irregular shaped patches of very light grey on both forewings, the patches being symmetrical on each wing. Hindwings nearly normal, but showing signs of pale colouring in areas between veins.

MR HUGH L. NEWMAN exhibited a large number of *Arctia caja*, L., bred in successive broods in the dark on cabbage up to the third generation and the fourth as living larvae in glass-top metal boxes. Also a ♀ *Pieris napi*, L., ab. *citronæa*, Frwk., the most extreme and remarkable dark ♀ he had ever bred.

MR G. B. OLIVER and MR G. H. OLIVER exhibited:—*Pieris rapæ*, L., ♀, a wild taken specimen of chrome buff coloration; Bedfordshire. *P. napi*, L., ♀ spring brood without the usual black scaling on apex; Bucks. *Brenthis* (A.) *euphrosyne*, L., ♀ upper and undersides purplish tinted; other aberrant forms. *Maniola jurtina*, L., ♀ (badly worn) with light blotched forewings and hindwings of a uniform greyish white; Beds. *Polyommatus coridon*, Poda, ab. *striata* and ab. *obsoleta* forms from Beds, Bucks and Herts. *Colias croceus*, Frery., a short series bred during January and February under normal indoor conditions from a typical ♀ taken in mid-September. The majority of the females reared were f. *helice*, Hb.

MR D. ODD exhibited minor varieties of *Polyommatus* (L.) *coridon*, Poda, *Argynnis paphia*, L., *M. jurtina*, L., *Z. trifolii*, Esp., and *Sphinx ligustri*, L.

MR R. M. PAYNE exhibited the uncommon dragonfly *Aeshna mixta*, Latr., a pair taken this season at Richmond, Surrey.

MR AUSTIN RICHARDSON exhibited the following Lepidoptera taken or bred during the season 1942:—

RHOPALOCERA.—A bred series of 6 *Apatura iris*, L., with larvae and pupae cases; Wilts. A series of 16 *Argynnis paphia*, L., all heavily marked or with confluent spots on forewings. A specimen of *Aglais urticae*, L., with almost black hindwings and white areas on apices of forewings. Two *Maniola jurtina*, L., with bleached area on forewings. A ♀ form of *Argynnis* (*Brenthis*) *euphrosyne*, L., with very light outer markings to forewings. An example of *Argynnis* (*Brenthis*) *selene*, L., heavily spotted towards bases of all four wings. All above from Forest of Dean. A varying series of *Euphydryas* (*Melitæa*) *aurinia*, Rott., and a series of *Polyommatus* (*Lysandra*) *coridon*, Poda, showing variation, both from Glos. A cream-coloured form of *Coenonympha pamphilus*, L., and one with suffused hindwings; Forest of Dean. A series of *Coenonympha tullia*, Hb. (*tiphon*, Rott.), including ♀♀ showing white hind margins; Aviemore. A specimen of *Heodes phlaeas*, L., with the left wing partly ab. *schmidtii*, Clrck.; Glos. A series of 10 *Satyrus galathea*, L., some being heavily marked; Glos.

HETEROCERA.—A series of *Monima* (*Taeniocampa*) *gracilis*, Fb., reddish form from New Forest and pink form from Forest of Dean. A series of *M. (T.) munda*, Esp., spotless and banded forms from Forest

of Dean. A series of *Palimpsestis octogesima*, Hb., from Forest of Dean. A series of *Mamestra furva*, Hb., from Aviemore. Two pairs of *Brachionycha sphinx*, Hufn., beaten in November 1941; Glos. A series of 75 *Xantholeuca (Oporina) croceago*, Fb., with two preserved larvae from Forest of Dean. Three specimens of *Cucullia chamomillae*, Schiff., with two preserved larvae; Wilts. A bred specimen of *Xylina (Calocampa) retusta*, Hb., with two preserved larvae of the scarce reddish striped and spotted form; Forest of Dean. A bred series of *Harmodia lepida*, Esp. (*carpophaga*, Bork.), including a specimen of the rare unicolorous bright yellow form; Glos. A series of the so-called brown II. (*D.*) *capsophila*, Dup., with a series of normal *capsophila* from Cork and Kerry, bred in 1937 and 1938 for comparison. A series of four of the very rare *Sarrothripus revayana*, Tr., ab. *stoninus*, Curt., one inclining towards ab. *atrata*. A series of 7 *Miana (Procus) fasciuncula*, Haw., six of the brown and one of the bright red form; Aviemore. A series of 10 *Anchoscelis helvola*, L., the small dark form from Rannoch. A very pale specimen of *Xanthia (Cirrhia) fulvago*, L., ab. *flavescens*, Esp.; Rannoch. A very dark specimen of *Amathes (Noctua) glareosa*, Hb.; Rannoch. Two very dark specimens of *Leucania conigera*, Fb.; Aviemore. A specimen of *Hepialus hecta*, L., with considerable white areas above the median band on the forewings; Aviemore. A series of *Aporophyla nigra*, Haw.; Rannoch. A bred series of eight *Agrochola (Cucullia) lychnitis*, Hb., with three preserved larvae; Oxon and Wilts. A series of 50 *Eumichtis protea*, Bork., very varied with a number showing prominent pale stigmata on a dark background; Rannoch. A series of 57 *Ortholitha chenopodiata*, L. (*limitata*, Scop.), including 19 melanic and 19 semi-melanic forms; Aviemore. A series of 34 *Coenocalpe (Phibalapteryx) lapidata*, Hb.; Rannoch. A bred series of 10 *Thera juniperata*, L.; Aviemore. A series of 15 *Thera firmata*, Hb., 11 taken at Aviemore with 4 bred from the New Forest. A series of six *Thera cognata*, Thnbg.; Aviemore. A series of 9 *Pachygastria trifolii*, Hb., dark brown form taken and bred from Somerset. A series of *Catocala sponsa*, L.; New Forest. A bred series of 6 *Boarmia roboraria*, Schiff., with two blown larvae; New Forest. Two specimens of *B. punctinalis*, Scop. (*consortaria*, Hb.), bred from the New Forest. A series of *Gnophos myrtillata*, Thnbg.; Aviemore. A series of three *Eupithecia pulchellata*, Steph., including two dark specimens bred Witherslack. A series of 13 *Bapta bimaculata*, Fb.; Glos. A series of 6 *Ortholitha mucronata*, Scop., with dark bands; Aviemore. A series of 7 *E. irriguata*, Hb.; New Forest. A series of 10 *E. plumbeolata*, Haw.; Forest of Dean. A bred series of 12 *E. valerianata*, Hb.; Windermere. A series of 5 *Synanthedon tipuliformis*, Clrck.; Glos. A series of 3 *Synanthedon sphecoformis*, Schiff., bred from Hants and one taken in Forest of Dean. A series of 7 *Synanthedon respiformis*, Esp., bred Wilts. A series of 7 *Synanthedon formicaeformis*, Esp.; Glos. A series of 4 *Chamaesphesia ichneumoniformis*, Schiff.; Glos. A series of 20 *Aegeria culiciformis*, L., including

one with a yellow and one with an orange band, bred Wilts. A specimen of *Deilephila (Celerio) galii*, Rott., bred Somerset.

MR C. RIPPON exhibited a large number of his photographs of Lepidoptera. They were contained in three volumes of the loose-leaf pattern. The first volume contained the Butterflies, the second the Hawks and Bombyces, and the third the Noctuae and Geometrae.

MR ARCHIBALD G. B. RUSSELL exhibited a selection of moths taken in Scotland with his son, Lieut. Anthony Russell, Gordon Highlanders (since killed in action in Malaya), as follows:—*Apamea assimilis*, Dbldy., 8 taken in the Rannoch district (1939). *Amathes alpicola*, Zett. (*hyperborea*, Zett.), 26 of a beautifully tinted form showing a wide range of variation including a remarkable ♀ with black forewings touched with blue, from pupae found in Co. Inverness, 1942. *Brachionycha nubeculosa*, Zett., a very pale grey form from Aviemore. *Aporophyla lutulenta*, Gn., examples of var. *sedi*, Bork., and var. *luneburgensis*, Frr., both from the Rannoch district. *Apatele leporina*, L., a white specimen from Aviemore. *Triphaena comes*, Hbn., var. *curtisii*, Newm., from Co. Moray. *Conistra vaccinii*, L., var. *suffusa*, Tutt, from Co. Kirkcudbright. *Achlya flavicornis*, L., a specimen heavily banded with black from Struan. *Plusia bractea*, Fb., eight from Perth. *Ortholitha scotica*, Ckne., a series from Co. Inverness, with a series of *Ortholitha mucronata*, Scop., from the same county for comparison. *Entephria flavicinctata*, Hb., twelve from the Rannoch area. *Dysstroma citrata*, L., some striking forms from Kirkcudbright and Perth. *Lampropteryx suffumata*, Schiff., an example with a pale bronze coloured band, and one of var. *porrittii* Robs., both from Aviemore. *Cleora jubata*, Thnbg., five from Co. Kirkcudbright. *Electrophaës corylata*, Thnbg., var. *albo-crenata*, Curt., from Co. Moray. *Xanthorhoe spadicearia*, Schiff., a specimen with yellow forewings and dark purple band from Aviemore. *Epirrhoe alternata*, Müll., an example with very narrow central band from Co. Kirkcudbright. *Selenia lunaria*, Schiff., var. *suffusa*, from Co. Banff. *Crocallis elinguaris*, L., two lacking the central band, from Aviemore. *Erannis defoliaria*, Ckrck., a remarkable black banded specimen from Co. Kirkcudbright.

MR S. G. CASTLE RUSSELL exhibited a ♂ *Argynnis euphrosyne*, L., the forewings heavily suffused with black, and hindwings also black, with rows of small fulvous spots, New Forest, June 1942. *Argynnis paphia*, L., a ♂ underside which has a large area of silver on both hindwings, and a var. *valezina*, Esp., underside of a chocolate colour. Both bred from New Forest ♀. A var. *valezina* underside, the black markings being extended into stripes.

Also the following remarkable collection of aberrations taken in the New Forest in July 1942 by MR E. E. JOHNSON:—*Argynnis euphrosyne*, L., an exceptionally pure white form of male. *Argynnis selene*, Schiff., two white ♂♂ and four very pale straw ♀♀. *Argynnis selene*, Schiff., a melanic ♀ with forewings of obsolescent character, with broad wedges

or bars on margins; hindwings, black with small fulvous spots on bases. *Argynnis paphia*, L., a beautiful and symmetrical example of a ♀ ab. *melaina-ocellata*, D'Aldin (very heavily suffused and rayed). *Argynnis paphia*, L., a truly halved gynandromorph, the sides and end of the body showing very clearly the division of the sexes. *Polygonia c-album*, L., a ♂ with the costal spots on forewings banded and the hindwings entirely black. *Maniola jurtina*, L., a most remarkable and unique melanic ♀, the entire area of all the wings, both upper and underside, being deep coal black except for a very small fulvous area around the spots in the forewings. The black on the hindwings is slightly shiny.

MR J. A. STEPHENS exhibited the following species of Coleoptera:—*Stilicus fragilis*, Gr. (*sulcicollis*, Eur. Cat.), taken 12.xii.40, out of a straw heap at Chatham. *Pogonochaerus dentatus*, (Fourc.), L., taken in October 1940 by beating Ivy; rare. *Xylophilus* (*Hylophilus*) *populneus*, Pz., not to be found in the London area, taken at the same place as *S. fragilis*. From the same heap of straw, *Acidota crenata*, Fb., on 4.xii.40. All the above were taken in the Chatham district.

MR E. E. SYMS exhibited living examples of the "Cluster Fly," *Pollenia rudis*, Fb., parasitic on some species of earthworm.

MR R. W. SPARROW exhibited British Microlepidoptera he had taken during the season, including *Cerostoma sequella*, Clrek., at Chalfont.

MR M. TALBOT exhibited hibernating larvae of *Limenitis camilla*, L. (*sibilla*, L.), and pupae of *Macroglossum stellatarum*, L.

MR F. H. TOMPKINS exhibited *Antitype* (*Polia*) *chi*, L., ♂ and ♀, bred from ova from a N.W. Sussex specimen; *Hyloicus pinastri*, L., from Bournemouth; and *Leucania l-album*, Esp., bred from S. Devon.

MR HY. J. TURNER exhibited a number of life-histories of Microlepidoptera of the genus *Coleophora* = *Eupista*, including several non-British species. He also showed the "British Butterfly" number of the paper *Young England*, published about 1860 by the late Edward Newman, and called attention to the List of "Reputed Species" numbering 76 which it contained.

MR H. TURNER (of Bournemouth).—*Hamearis lucina*, L. A truly halved gynandromorph of this species. Bred from New Forest ova.

MR S. WAKELY exhibited a number of species of Lepidoptera captured and bred during the current season. These included a small series of *Aedes piercella*, Benct., a species not hitherto recorded in Britain, but mentioned in F. N. Pierce's *Genitalia of the Tineina*: "This species may occur in Britain." The moths were bred from a bird's nest taken from an old hollow tree branch at Norwood. It is likely this species has been mistaken for *Aedes fuscipunctella*, Haw., which it closely resembles, but it has a light head and is a paler species. Other species shown were: *Pylarge fumata*, Steph., *Phthorimaea viscariella*, Staint., *Elachista perplexella*, Staint., *E. megerlella*, Staint., and *E. scirpii*, Staint.—these

five species had been sent from Lancashire in larval form by Mr L. T. Ford; *Acronycta leporina*, Linn. (Norwood), *Hadena contigua*, Vill. (Ashtead), *Eupithecia fraxinata*, Crewe (*innotata*, Hufn.) (Norwood), *Aegeria flaviventris*, Staud. (Effingham), *Eucosma foenella*, Linn. (bred from larvae in rootstocks of *Artemisia abrotanum* from a Norwood garden), *Polychrosis fuligana*, Haw. (Ashtead), *Recurvaria leucatella*, Clerck (Norwood), *Gelechia rhombella*, Schiff. (Norwood), *Phthorimaea obsoletella*, Fisch. v. Rösl. (Selhurst), *P. atriplicella*, Fisch. v. Rösl. (Norwood), *Chrysoclista rhamnella*, Zell. (Mickleham), *Coleophora lixella*, Zell. (Ranmore), *Coleophora onosmella*, Brahm (Mickleham), and various other more or less common species.

LT. W. A. WATKINS, R.N.V.R., exhibited a long series of variations of *Euphydryas (Melitaea) aurinia*, Rott., taken in W. Devon.

MR H. O. WELLS exhibited butterflies caught in 1941 and 1942 within the 3-mile radius of Epsom, Surrey, including many varieties of *P. (L.) coridon*, Poda, with a series of ab. *fowleri*, Sth.; varieties of *H. phlaeas*, L., *M. jurtina*, L., and a *B. (A.) euphrosyne*, L., with upperside yellow. The best capture was an *Aglais urticae*, L., almost black, 16.vii.42.

MR A. S. WHEELER exhibited an *Aglais urticae*, L., in which the marking was typical but the usual ground colour was nearly all missing.

DR HAROLD B. WILLIAMS exhibited:—1. Examples of homoeosis in British Lepidoptera—(a) *Pieris napi*, ab. *hibernica*, Schmidt (*citrona*, Frohawk), bred by H. W. Head, July 1931, Donegal origin, with forewing markings at tornus and near outer margin of right hindwing. (b) *Aglais urticae*, L., bred by L. W. Newman, July 1924, from North Kent larva, with large areas of hindwing marking on underside of left forewing. (c) *Papilio machaon*, L., bred by the exhibitor, 23rd June 1942, from Norfolk pupa, with considerable areas of forewing marking on the upperside of both hindwings, the tail on the right hindwing obsolescent. (d) *Dilina (Mimas) tiliae*, L., bred by L. W. Newman, May 1941, from North Kent pupa, with areas of hindwing marking on the upperside of right forewing, on the outer margin. (e) *Smerinthus*, *hyb. hybridus*, St., bred by the exhibitor, 16th August 1940, with a stripe of hindwing marking on the left forewing upperside. This example formed part of the same brood as the larva described and figured by Dr E. A. Cockayne, "Prothetely in a larva of *Smerinthus*, *hyb. hybridus*, Steph.," *Trans. R. Ent. Soc. Lond.*, 1941.

2. Series of *Dilina tiliae*, L., ab. *centripuncta*, Clark, bred May and June 1940, being part of a second generation from a similar aberration taken by Dr G. H. T. Stovin at Southend in 1938. The form is recessive to the type, but one example, not so extreme as those exhibited, appeared in the first generation. This irregularity has been recorded previously, by Standfuss (*Insekten-Börse*, xix, 163), who obtained three examples and three intermediates in five large broods resulting from

crossings of ab. *centripuncta* and typical *tiliae*, but misunderstood his results.

BARON C. G. M. DE WORMS exhibited British Lepidoptera taken and bred during 1942.—A. Series of Butterflies:—*Pieris rapae*, L., from wild larvae collected near Salisbury; Spring brood showing variation in sexes. *Argynnis paphia*, L., *valezina*, Esp., taken New Forest. *Limnitis camilla*, L., bred from New Forest larvae. *Ruralis* (*Zephyrus*) *betulae*, L., bred from Hampshire larvae. *Argynnis cydippe*, L., taken near Salisbury.

B. Series of Moths:—*Polyphoca* (*Achlya*) *flavicornis*, L., Aviemore. *Diacrisia sannio*, L., Hampshire and New Forest. *Hylophila* (*Bena*) *bicolorana*, Fuess., bred from Surrey. *Agrotis ripae*, Hb., bred from Somerset. *A. praecox*, L., bred from Formby larvae. *Hadena glauca*, Hb., Aviemore. *Apamea ophiogramma*, Esp., bred from Salisbury larvae. *Polia* (*Antitype*) *chi*, L. taken in Galloway. *Oria musculosa*, Hb., taken near Salisbury. *Monima gracilis*, Fb. (a) bred from Galloway (pink), bred from New Forest (red), bred from Salisbury (cream). *Xantholeuca croceago*, Fb., taken in the Forest of Dean. *Cucullia chamomillae*, Schiff., from Salisbury. *Cucullia lychnitis*, Rbr., bred from Salisbury. *Catocala promissa*, L., taken in New Forest. *Plusia interrogationis*, L., bred from Aviemore. *Toxocampa pastinum*, taken near Salisbury. *Ortholitha Scotica*, Ckn., taken at Aviemore. *Scotosia* (*rhamnata*, Hufn.) *transversata*, Schiff., bred from Salisbury district. *Oporinia filigrammaria*, H.-S., taken in Galloway. *Thera obeliscata*, Hb., bred from Salisbury. *Hydriomena coerulata*, Fb. (*impluviata*, Hb.), taken at Salisbury. *Ellopia fasciaria*, L. (*prosapiaria*, L.), from Struan, Perth. *Bupalus piniaria*, L., from Aviemore. *Monima incerta*, Hfn., from Aviemore. *Monima* (*Orthosia*) *munda*, Esp., bred from Salisbury.

C. The following uncommon species, rarities, and aberrations of British Lepidoptera were taken or bred during the season of 1942 by the exhibitor:—*Pieris rapae*, L., var. *immaculata*, ♂♂ bred, Salisbury, May. *Pieris napi*, L., a heavily marked ♀, Salisbury, August. *Argynnis paphia*, L., var. *valezina*, Esp., ab. *confluens*, Spuler; *Maniola jurtina*, L., a male with apical eye-spots absent and a dwarf specimen, Salisbury, 1942. *Polyommatus* (*Lysandra*) *coridon*, Poda, a series of ♂♂ and ♀♀ showing absence of normal spotting. *Polyommatus icarus*, Rott., a ♀ with very bright markings, Formby, May 1942. *Polyommatus* (*Lysandra*) *bellargus*, Rott., blue forms of ♀♀ and one ab. *metallica* (*Odontesia carmelita*, Esp., a specimen from Aviemore, 25th May. *Amathes hyperborea*, Zett. (*alpina*, Zett.), a series bred from larvae and pupae, Aviemore, showing variation in markings. *Dysstroma citrata*, L. (*immanata*, Haw.), heavily marked specimen from Aviemore (bred). *Monima incerta*, Hfn., a cream coloured specimen taken at Aviemore. *Monima opima*, Hb., a dark form, Salisbury. *Gonodontis bidentata*, Clrck., a pale form from Aviemore. *Heliothis dipsacea*, L., a pale form, Salisbury. *Mamestra nana*, Hufn. (*dentina*, Esp.), a dark form, Salisbury. *Brechionycha nubeculosa*, Esp., a dark form from Aviemore.





OVA OF *O. MUSCIVORA*. Fig. I. 5. Fig. II. 33.

MR N. G. WYKES exhibited (1) 10 *Pieris rapae*, L., ♀, showing variation in size of lower median spot, all taken in one locality in the Chilterns, August 1942. (2) 11 *Brenthis (A.) selene*, L., including 2 bleached ♂s, 1 very brightly scaled ♀ and 2 heavily marked ♀s, Surrey, June 1942. (3) *B. (A.) euphrosyne*, L., ♀, second brood, New Forest, 31.vii.42. (4) *C. pamphilus* ♂, underside with black suffusion on forewing, Chilterns, June 1942. (5) *M. jurtina*, L., selected forms including 1 ♀ with all the ground colour pale buff, Hants, 3.viii.42. (6) *H. (L.) phlaeas*, L., 2 ♂s with suffused forewings; 1 ab. *caeruleo-puncta*, Stdgr., with 4 clearly marked blue spots. (7) 16 *P. (L.) coridon*, including 6 ♂ ab. *metallica*, ♀ ab. *fowleri*, and ♂ and ♀ obsolete forms. (8) 15 *P. (L.) bellargus*, Rott., blue ♀♀ in both broods, Chilterns, June and September 1942. (9) 6 *P. icarus*, Rott., including 1 ♂ left forewing ab. *radiata*, Tutt, and hindwing limbo-juncta; 1 ♂ ab. *caeca*, Gillm., Chilterns, August 1942. (10) 96 *Plebeius aegon*, Schiff. (*argus*, Hw.), 32 ♂ and 64 ♀, including 1 ♂ pale upperside, 7 bleached forms of ♀ upperside; ♂ undersides, 1 *costajuncta-digitata*, 1 *post-radiata*; ♀ undersides, *costa-juncta*, Tutt, *basi-juncta*, *costi-basi-juncta*, *glomerata*, *discreta* (very extreme with all hindwings white ground), Hants and Surrey, July 1942.

APPENDIX.

PHOTOGRAPHS OF OVA OF *ORIA MUSCULOSA*.—The two photographs show slightly enlarged ($\times 5$ —Fig. I) and more highly magnified ($\times 33$ —Fig. II) reproductions of a batch of ova of *Oria musculosa*, the "Brighton Wainscot," taken near Salisbury. They were deposited about the middle of August 1942 by a captured female which had been put in a cage into which had been introduced both wheat and oat stems. The ova here shown were laid in a neat row in the sheath of some oat straw. They began colouring up during October and are expected to hatch in March. On close examination it is evident they are enclosed in a very strong glutinous envelope, which no doubt preserves them through the winter and may throw some light on their life-history in the natural state, which still remains to be worked out. So far as I am aware, these are the first reproductions of ova of this species in our literature. The excellent photos and enlargements were kindly carried out by Mr R. McV. Weston.—BARON DE WORMS.

CORRECTIONS.—Last year's Exhibition Report (1941):—

Omit "from that locality," line 16 from the bottom of p. (27).
 For "typical" read "type," line 14 from the bottom of p. (27).
 For "both" read "with," line 11 from the top of p. (28).
 For "typical" read "type," line 12 from the top of p. (28).
 After "Schreb.," add "mahogany form, Delamere. Two specimens of *Agrotis simulans*," line 2 from the bottom of p. (28).

FIELD MEETINGS.

18th APRIL 1942.

BOOKHAM COMMON.

Leader: Mr F. J. COULSON.

The meeting was well attended, there being about sixteen members and friends present. The weather conditions were good, and a pleasant time was spent beating and searching in the woods and in the vicinity of the ponds. The larva of *Laspeyria* (*Aventia*) *flexula*, Schiff., was beaten from lichen-covered hawthorn. Besides many other species of Coleoptera the following, not previously recorded in the "Proceedings" from this locality, were secured:—*Cicindela campestris*, L.; *Chlaenius nigricornis*, F.; *Onthophagus fracticornis*, Preyss.; *Aphodius merdarius*, F.; *A. obliteratus*, Panz.; *A. prodromus*, Brahm; *Oxyomus silvestris*, Scop.; *Cryptopleurum minutum*, F.; *Agriotes sputator*, L.; *Apion violaceum*, Kirby; and *Xyloterus domesticus*, L.

As regards Micro-lepidoptera, the larvae of *Lithocolletis trifusciella*, Hw., were locally common on honeysuckle, and larvae of *Phthorimaea fraternella*, Dgl., were found in spun shoots of *Stellaria graminea*, L.

4th JULY 1942.

ASHTEAD.

Leader: Mr F. STANLEY-SMITH, F.R.E.S.

Thirteen members and one visitor attended. The day was fine and warm, with intermittent sunshine. Butterflies were numerous, *Argynnis cydippe*, L., and *Limenitis camilla*, L., being fresh and particularly noticeable. A newly-emerged *Apatele* (*Acronicta*) *leporina*, L., found on a tree-trunk, was whiter than normal. Among lepidopterous larvae, *Polychrosis fuligana*, Haw., were found on *Carduus arvensis*, Curt., and *Leucoptera lotella*, Staint., on *Lotus major*, Scop.

SOME INTERESTING COLEOPTERA FROM THE CHATHAM DISTRICT.

By J. A. STEPHENS, F.R.E.S.

Read 14th February 1942.

Having seen in the notice sent out by our Secretary that there was some difficulty in getting papers read at our meetings because of the war interfering with collecting, etc., I thought a paper on my collecting at Chatham might interest members and help on the study of Coleoptera.

The title of this paper was suggested by our Librarian, who has done much to help me and others in the study of a very fascinating subject. I should like to say that I have only been collecting for about eight years and of this the first year's was only a casual taking of a few beetles as they came to my notice. My interest was first aroused when, on my allotment, I picked up several Carabidae which happened to be *Carabus monilis*, Müll., and having in my possession Rye's book, which I had recently bought for 2d, I tried to find out their names; so to Rye I owe my start. Then having found a few more species I visited the local Museum at Rochester but I received no help there, though I obtained access to the works of Curtis. Books were of very little help, so in May 1934 I visited the Natural History Museum with the idea of naming my species. There I was advised to obtain a Student's ticket, and after a few visits I met Dr Blair and through his help and kindness I began to collect and study with real enthusiasm.

I ought also to say how fortunate I am to live in an area where so many different species are found, many of them rare. In the past six years I have taken in the Chatham area, including Cobham Park, about 1000 different species; the late Commander J. J. Walker, R.N., took over 1600 in this area but in a much longer period. This record I hope to beat if I stay in Chatham a few more years.

Now a word about some of those that have interested me. First I should like to mention the common "Tiger beetle," *Cicindela campestris*, L., because of my first capture and a little experiment I made with one. The circumstances of my first capture are very vivid to me still; I had searched for this species for two seasons without success; I was told it was common but I could not find one. At last one evening in the spring of 1935 I happened to be hunting in an old brickfield, where beetles of many kinds are found in abundance, there being enormous heaps of stones which for many years past have been turned out when the men were digging the clay, and under one of these as I lifted it up, sat a fine specimen. I exclaimed aloud in my excitement "A tiger;" I secured this but no more that evening. A day or two afterwards I secured a few more. One of these Tiger beetles I turned loose

in my greenhouse, where I kept it for a week or more before it escaped.

One day I saw it come out of a hiding place and run up a post on to one of the plant stages; it stopped and appeared to be looking around for prey, so I quietly picked up a long stem of grass, with a head on, which happened to be lying on the floor, and gently pushed it towards the beetle, turning it about to attract its attention, but no notice was taken of it until within 20 inches or thereabouts when the beetle suddenly began to run towards it. I pulled the grass away, drawing it along the stage, but when more than 20 inches away the beetle ceased to follow. I tried this two or three times with the same results, until at last I pushed it closer, when the beetle dashed up and seized it. I am convinced that the beetle could not see the object when more than 20 inches away, neither could it see my hand or arm, or it would have run away.

I also tried to photograph a Tiger beetle in the open after this, but as I got within a short distance it ran off a few yards. It did this several times until it finally took to wing and flew off. Now this is interesting because everyone knows what a strong flier it is. How does it see its way when flying? Dr Blair suggested to me that it may have some other power than sight to aid it. I wonder if we shall find this out one day.

The Bombardier, *Brachinus crepitans*, L., has interested me also because, though so common, no person this side of the Atlantic has seen the larvae with the exception of a German scientist I met at the Natural History Museum who said he had once seen one. I have tried to breed them. So has my friend Mr Turpin, to whom I gave several living beetles. He kept them at the Museum and fed them (they readily eat sausage meat) and he told me that he saw them mated, but no eggs were laid and all eventually died. I kept mine in a large wooden box, half filled with soil, stones, and grass tufts, trying to give them natural surroundings, but without result. It seems that neither they nor the *Langelandia anophthalma*, Ab., which I have also tried, will breed in captivity. One day I thought I had succeeded in obtaining the larvae as I found two grubs when digging down in a clayey bank where I had just seen two or three "Bombardiers" which, being very sluggish, appeared to have just emerged from pupa. I took the two larvae home and put them in a glass jar partly filled with earth. One died after a day or so, the other lived and thrived and had excavated a hole and was preparing to pupate. I had to be away from home for a few days so I left the jar under the stage in my greenhouse, but unfortunately I forgot to cover the top and when I returned I found the drippings from the watering of the plants above had got in and drowned the larva; however, I took a photo of it and feel sure it was the larva of the Bombardier, but I have no definite proof.

Among the *Staphylinidae*, *Stilicis fragilis*, Gr., has interested me because of its habitat; I have taken this in one place only in Chatham, in a corner of a field where a corn stack usually stands and where there

are always heaps of straw lying about year after year; in this straw I have taken the species in great plenty but always in the straw and never in hay, or dried grass, or leaves which lie about with the straw. This year a large clump of Mangold is on this spot and the beetles are still there in the straw with which the Mangold is covered. Last spring I was in Hertfordshire, near Bishops' Stortford, and there I found the species in a small heap of straw. A few yards away stood an old haystack with a lot of hay littered around, but there were no *fragilis* in that; I ask what does *fragilis* find in straw to make it live exclusively in it? I collect a great deal from hay in the winter months and find no *fragilis*, but plenty of the other species of *Stilicis*.

Another interesting fact I have noticed is how certain species stay in the same spot year after year and do not seem to move away although they have strong wings. One is *Opilo mollis*, L. I first took this on August Bank Holiday, 1936, when beating a hazel bush, and the next year about the same time I took another in the same spot. Three years afterwards and also last year I took a few more on Hawthorn blossom some yards from this place, and with the exception of one taken on Oak in Cobham Park I have not met with it elsewhere.* I have also taken *Amphotis marginata*, F., on this Hawthorn hedge in succeeding years and *Attagenus pello*, L., in succeeding years on the same Alder bush, which is at the end of this short hedge and quite near the farm buildings.

Similarly, the weevil *Apion semivittatum*, Gy., which I have found for the past years on a plant which I am told is the annual Mercury, *Mercurialis annua*, L. A few plants come up yearly on the same spot on a bank just outside my back garden gate. This back way is used by many people besides the householders and a number of children go this way to and from school and they trample down the herbage, but in spite of this the beetles can be seen on these few plants each September. Although there are plenty of these plants in the district in our gardens and allotments, also on the roadsides, *Apion semivittatum* are not seen on them, yet I am told if you find the right plant food you will find the beetle. This is certainly not so with this weevil, which is one of the rarer *Apions* and was, I believe, first discovered at Margate. This seems to prove that some species do not move away from their original breeding places.

Another interesting species is *Langelandia anophthalma*, Ab., two specimens of which I found in a flower border near my house on August Bank Holiday, 1935, when sifting soil from under a small heap of manure. This species has only been taken in three places in Britain. Mr Theodore Wood discovered it about 56 years ago in decaying potatoes in a garden at St Peter's, Broadstairs. I found it in my own garden in 1935, as I have already stated, and in following years on the same spot under flower roots and decaying posts of the fence, in good numbers,

*[Probably breeding in an old tree nearby with *Xestobium* or *Anobium*.—K.G.B.]

all within a space of 4 or 5 yards, and Mr Donisthorpe recently took it at the roots of a tree in Windsor Park. Why and how is it that they have only been found in these three spots? There is no connection between the places; they are several miles apart, and no one from my place has visited the other two places to carry them. How did they get to my garden? They are blind and live some depth in the earth; I do not think they can fly and they are very sluggish in their movements. Again, what do they feed on? Not decaying potatoes, as there are no potatoes in my garden or in Windsor Park. Someone will say fungi. Well, I have tried certain fungi both by burying it and leaving it on top of the earth, the same with potatoes, but no *anophthalma* have been found near it. I once saw one, but only one, on a piece of potato when I was trying to breed them in captivity. Another interesting fact is that, when looking for this beetle, if I find *Anommatus 12-striatus*, Müll., I can be sure to find *anophthalma* with or near it, so they must both live on the same kind of food, and I have not found *12-striatus* anywhere else except in this spot in my garden. I had expected to find both or *anophthalma* at Cobham under trees as Mr Donisthorpe did at Windsor, the conditions being similar, but up to the present I have been unsuccessful.

I have brought along for exhibition to-night a variety of a species, *Nacerda melanura*, L., which is rather out of the ordinary having regard to its size, colour, and the place where it was taken. One Sunday evening in June 1936 we had a very severe storm, almost a cyclone, which came up from the south-east at about eight o'clock. On the previous Thursday and Friday we had had two very violent storms which flooded the houses and shops, but the one on Sunday was much worse. I mention this because a few days afterwards I took this beetle under a clod of earth on my allotment, which is some distance from the Medway; my other specimens were taken at Teynham some miles away. I took this latest specimen up to the Natural History Museum to verify it, but we could find nothing like it in either the British or Foreign collections. It was probably blown there in the storm and may have come miles.

Another species about which I wish to say a word has been very destructive to my strawberry plot, having almost entirely destroyed the crop for the last two years. It is *Rhynchites germanicus*, Hb. The beetles attack the plants, as they are beginning to bloom, by eating around the stems of both the new leaves and the bloom, about half-an-inch from the top. They do not eat through the stem and they do not attack the blossom itself but the affected leaves and blooms soon wither and die. I have tried many remedies but nothing stops them. The only way is to catch them; they are easily seen on the plants but fall to the earth as soon as they see your hand or shadow. I do not know where they breed but possibly in the plant itself, although I have never found any beetle or larvae in or under the plants. I have taken it on Birch in a wood some distance from this. This is a new experi-

once to me, and I have not seen or heard of such an attack before, although I have the Government leaflets on agriculture and pests, and I was brought up in the strawberry growing trade, my people being growers near Southampton, and I worked at it myself until I was 20 years old, so I claim to know something about strawberries. There are one or two other weevils that sometimes attack strawberry plants and one, *Anthonomus rubi*, Hb., punctures the stems, according to the Agriculture leaflet, but I have never seen this on strawberries nor other fruit. I find them in abundance on the wild rose, which they seem to prefer. Other people's strawberries on these allotments are not affected, so why mine? My wife suggests that it is because the weevils know I hunt beetles and they try to get their own back on me! I have had to destroy most of the plot, but have left a few roots to see what will happen this year.

The last species I wish to mention is *Trachodes hispidus*, L. Fowler, in Vol. 5, says of this beetle that nothing is known of its history, but in Vol. 6, p. 309, he says it has been bred from Oak twigs by Rev. G. Crawshay. I also have proved this, having taken it from a fallen Oak bough in Cobham Park. I found some larvae and pupae under the bark. The pupae I took home and in a few days the beetles emerged and I found that they were *T. hispidus*. This Oak bough had fallen during the previous winter and containing sap, and had not started to decay; the part of the bough where they were found was near the top and about 6 inches in diameter. I took a number a day or so before this under the bough in the dead leaves. This was in April of last year. My first specimen I took was on Sallow blossom in March 1938 in a wood at Chatham.

I should like to tell you about some of the interesting visits I have made to Cobham Park, but time will not permit.

One last question: Why are some beetles so very rare, being taken singly as a rule? Sometimes it is a male one finds, and search as one may no other is to be found; a female should be about somewhere, but where? Does not the female lay as many eggs as the common species, or have they more enemies which destroy them? This and several other things make us feel how little we really know about some members of the Order Coleoptera.

**NOTES ON A BROOD OF COLIAS CROCEUS, FRG.,
VAR. HELICE, HB.**

Joint Exhibit by Dr K. G. Blair and Mr C. N. Hawkins.
Read 14th February 1942.

PART I. By Dr K. G. BLAIR.

On 20th September last, when in company with Mr C. N. Hawkins at Box Hill, I noticed a specimen of *Colias croceus* behaving rather curiously, repeatedly flying to a flower of Scabious on the hill-side above the path, and away again. On approaching the flower a specimen of var. *helice* was seen to be sitting thereon, and both butterflies were secured. Next day these were put in a large flower-pot containing some sprigs of *Lotus*, and placed in the sunshine. The following evening (22nd) the *Lotus* was dotted over with the eggs of the butterfly but the male was dead. No pairing was observed and it is quite possible that the female had already paired before capture. There were about 40 eggs, about half being taken by Mr Hawkins, the other half being retained by me, but my stock was increased by a number of further eggs, about 20, laid the next day before the death of the female. All the eggs hatched on 28th and 29th, but the young larvae were very sluggish, scarcely moving from their leaflet, and almost all devoured their eggshells. My lot were at first kept on the sprigs in the open, but after the first moult were placed, for greater convenience in changing the food, in two glass-topped tin boxes and kept in a North-facing room without heat. Growth was rather slow and uneven, some outstripping the others, but with numerous intermediate stages. Soon, however, disease made its appearance in both boxes, a dark spot appearing on the larva, which ceased feeding and died. At first only the smaller larvae appeared to be attacked, but subsequently larger ones too. By 4th November over half of them had succumbed, when the survivors (the most advanced just in last instar) were removed to a wooden cage with glass front and placed in a temperature of about 70° F. Their response was immediate in the form of more rapid growth and though further deaths occurred during the next few days they then ceased. They commenced to spin up for pupation on 9th November and between 11th and 19th ten pupae were formed, all head upwards on the sides of the cage. One of these went black and died, perhaps a belated case of the same disease that killed the larvae. It is uncertain what caused this disease, or what was its nature, fungoid or bacterial, but it is possible that it arose from some red clover, which was for a time used as a food-plant, some of the leaves of which showed a whitish appearance due to mould. After removal to the warmer temperature white clover was used, but before this red clover, a small yellow clover, and sainfoin as well as *Lotus* had all been readily accepted. The nine re-

sultant pupae (out of 35 to 40 eggs) emerged between 23rd November and 1st December, producing four ♂♂ and five ♀♀, of which two were var. *helice*, both distinctly whiter than the parent, one of them with the normal orange spot on the hind wings, but in the other this spot was small and yellow. I will leave Mr Hawkins to report on his portion of the brood and to comment on the genetics.

PART II. By Mr C. N. HAWKINS.

Dr Blair very kindly gave me some of the eggs from the above mentioned *helice* and on counting them I found 23. All these hatched on the 29th and 30th September but unfortunately two of the tiny 1st stadium larvae were accidentally lost, probably through being thrown away with old food. The remaining 21 were kept for a considerable time in a North-facing room without heat, on bunches of *Lotus* or clover (in water but not enclosed in a cage), but were later moved to a warmer room facing S.E., where the sun could reach them for part of the day at least. Growth was very slow though all seemed perfectly healthy. When Dr Blair's larvae began to prepare for pupation I decided it was time to hasten mine if possible and so placed them in closed glass-fronted cages (on sprays of clover as before) in a warm cupboard at a temperature of about 70°-75° F. (once it reached 85° F. during a warm night), and from this time progress was much more rapid. The larvae moulted four times (not counting the change to pupa), the most advanced example doing so on the 8th, 16th, and 25th October and 12th November, and pupating some days later, but others were much slower than this. One larva was preserved, one died after spinning up, and 19 healthy pupae were obtained. These pupae yielded, in due course, eight ♂ and nine ♀ *croceus* and two ♀ *helice*, both the latter having orange spots on the hindwings, but one being yellow in tint like the ♀ parent or even brighter. Adding these to Dr Blair's results gives 12 ♂, 12 ♀ *croceus*, and 4 ♀ *helice*, 28 examples in all, with a 3:1 *croceus* : *helice* result in the ♀. The expectation for the ♀ (assuming the unknown ♂ parent to have been a pure *croceus*, which would give the smaller proportion of *helice* in the offspring) was 1:1 *croceus* : *helice*, i.e. 8 *croceus* : 8 *helice* in 16 examples. My larvae, which suffered the fewer losses, actually yielded the more abnormal proportion, i.e. 9 *croceus* : 2 *helice* in the ♀s, a ratio of more than 4:1. Normally the ratios work out more or less in accordance with the expectation for the species. In recent years our "Proceedings" have recorded three broods (from wild parents) containing *helice* (or a modification of that form) and in each case that was true. In 1927/28, at p. 109, L. W. Newman recorded a brood (from a *helice* ♀) containing 112 ♂, 49 ♀ *croceus*, and 47 ♀ *helice*; in 1938-39 R. J. Burton recorded (from *acroceus* ♀—the unknown ♂ must have been a heterozygote carrying the *helice* factor) 26 ♂, 11 ♀ *croceus*, and 12 ♀ *helice*, and at pp. 23-24 H. L. Dolton recorded (from a *pallida* Tutt ♀) 54 ♂, 25 ♀ *croceus*, and 22 ♀ *pallida*. See also Cockayne, 1932, "Entomologist," 65 : 170 *et seq.*, and Ford,

1937, "Biological Review," 12 : 490 *et seq.* For the purposes of this note all colour modifications of the pale form of ♀ in *croceus* are regarded as *helice* since, according to Ford, they are not worth separating for genetical purposes, as contrasted with the typical *croceus* form (Ford, *l.c.*, at p. 491, and 1942, "Entomologist," 75 : 5 (Appendix 1)). There appears to be no information available as to the incidence of the orange and pale spots in the hind wings, but so far as I can find out from inspection of long series in the Brit. Mus. and elsewhere, the pale spots never appear in typical *croceus*, though there is some variation in the tint of the orange spots. In the present brood the ♀ parent *helice* was a pale yellowish specimen with orange spotted hindwings; the two *helice* in Dr Blair's portion of the brood were very white, one with orange-spotted hindwings and the other with very pale cream spots. Of the two *helice* in my part, both have orange-spotted hindwings but one has the ground colour brightish pale yellow and the other is white. In this case the captured female parent must obviously have been a heterozygote (otherwise, *helice* being dominant to *croceus*, there could have been no *croceus* ♀s in her offspring) and therefore the ova which she produced would have been of two kinds, so far as the *helice* factor is concerned, one kind *croceus* and the other *helice*, and these two kinds should have been and probably were, over the total number of eggs formed, in approximately equal proportions. As she died so soon after capture and as her abdomen is now very shrunken it seems likely that most of her eggs had been already laid and that those laid in captivity were the last she had. A possible explanation of our abnormal figures is, therefore, that her *croceus* and *helice* ova were not evenly distributed throughout her total complement, that most of her *helice* eggs were laid before capture, and that by chance, in the case of this particular female, her last few ova contained an undue proportion of *croceus*. An alternative possibility is that, in this particular brood, there was, as may happen for such factors in any species as an abnormality, an uneven distribution of the *helice* and *croceus* factors between the two sexes, so that the deficiency in *helice* ♀s was actually counter-balanced by an excess of *helice*-carrying males. As the latter are quite indistinguishable visually from normal *croceus* ♂s, the only way of testing the matter would have been to have paired every one of our males with bred females of known genetic constitution, and this, of course, we had no opportunity of doing. Owing to the ever-present chance of such uneven distribution between the sexes, it would appear to be very dangerous to attempt to attach any significance to unexpected results of single broods in any of these sex-limited cases, still more so where figures for a portion only of a brood are available for study.

NOTES ON SOME PALAEARCTIC WADERS OBSERVED IN THE KARROO.

By J. SNEYD TAYLOR, M.A., D.I.C., F.R.E.S.

Read 14th March 1942.

In reading through a recent appeal by the Hon. Secretary for papers, I noticed that the latter need not necessarily be confined to entomological subjects. I have therefore drawn up the following paper on European waders, which I have observed locally, in the hope that it may be of some interest to fellow members.

Before proceeding further, a word or two about the locality concerned—Graaff-Reinet—may not be out of place. Graaff-Reinet is a town of some 4000 European inhabitants, and the centre of the district of that name. It is also the capital of that part of the Karroo known as the Cape Midlands. It is situated at an altitude of 2463 feet, and is some 123 miles from the coast (east), as the crow flies. A considerable part of the district is mountainous, the vegetation is karroid in nature, and the annual rainfall is some ten to thirteen inches. Close to the town is a large irrigation lake or dam, constructed seventeen years ago, on the Sundays River, which rises about fifty miles further north. When full, which is very seldom, the lake is about $4\frac{1}{2}$ miles in length. It is, however, seldom more than half-full, and very often much less. The upper section of this lake, where the shore is composed of mud, affords excellent opportunities for bird observation, as it attracts a large variety of bird-life, including waders. It sometimes happens, when heavy rains occur and the lake in consequence receives a large amount of water, that the water level rises, covering the mud, and reaches the vegetation (coarse grass and weeds) growing further up. This results in the disappearance of most of the waders for the time being, but such conditions do not often occur, and are not of long duration, as the level falls rapidly when water is drawn off for irrigation purposes. I fear that I am apt to forget the original purpose of the lake, and do not always share in the general rejoicings when it receives a large, and much desired, quantity of water. But for this and other dams, waders and water-fowl would be seldom seen in this dry part of the world, as the rivers, especially the upper reaches, are generally bone dry.

I have been carrying out regular observations for the last six years, and many of the records dealt with in this paper have appeared in "The Ostrich," the journal of the South African Ornithological Society. The numbers of the various species observed are, of course, small compared with those which occur on the estuaries and other suitable places near the coast. The little stint, for example, which here occurs in hundreds, can be seen in thousands near Cape Town. I think it is interesting,

however, that so many species can be seen so far inland, and well off what one imagines to be the beaten track. The number of species for this lake could most probably be enlarged; from time to time there have been birds present of which only distant and fleeting glimpses were obtained, and concerning the identity of which I could not be certain. It is often a matter of pure luck that one sees an unusual bird, as many of them only spend a day or two on the lake and are then off on their journeys again. As Mr Brian Vesey-Fitzgerald so truly remarks, "It does not matter how expert an ornithologist you may be, it does not matter if you are gifted with eyesight keener than that of other men, you will not see a rare bird unless you and he (and not always then) happen to be in the same place at the same time, and in daylight" (4).

The following are the European waders observed at Graaff-Reinet during the last six years, and presented in the order in which they are given in Dr Austin Roberts' recent standard work on South African birds—"The Birds of South Africa" (3). The scientific names of the species dealt with are given in an appendix at the end of the paper.

1. **TURNSTONE.** The turnstone is a summer visitor to the coasts of S. Africa, stated to be rare in the Eastern Cape Province (2), and I have only once observed it locally. This was on 2nd October 1938, when two birds were present. They were remarkably tame, and allowed of near approach. Both had some traces of black markings on the neck, but were otherwise in winter plumage. They were busily engaged in turning over small lumps of dried mud in a search for food, there being few stones about. I visited the lake again on the following day in the hope of seeing them once more, but without success.

2. **RINGED PLOVER.** The ringed plover has been an irregular, although not uncommon, visitor during the last couple of years. It was first recorded on 17th October 1938, when one bird in adult plumage was observed, but which was not seen subsequently. On 11th and 18th December of the same year an immature specimen, minus the black gorget, but otherwise like the adult, was noted. Its identity puzzled me at first, but on the matter being referred to Dr E. L. Gill, of the South African Museum, Cape Town, he suggested that it might be an immature ringed plover, and this later proved to be correct. On 8th January 1939 two specimens were seen, while four were present on the 15th. In these the black gorget was becoming more evident, although there was still a white patch in front. On 19th February two birds in adult plumage were observed, and the call, something like a soft and muffled version of that of the green plover, was heard on 26th March. The species was last seen on 20th April, when one bird in adult plumage was noted. During the summer of 1939-40 ringed plover was only observed on two occasions in February, two specimens in immature plumage being present in each case. In the summer of 1940-41 the species was seen on ten occasions from 29th October, when two birds,

one of which was immature, were noted, until 11th April, when one was seen. The largest number seen at one time was three, and immature specimens were noted up to 9th February. The ringed plover is a common summer visitor on estuaries and lagoons near the coast, but is said to be uncommon inland (2), while immature specimens sometimes remain over through the southern winter (3).

3. **CASPIAN PLOVER.** This species, which breeds in S.E. Russia and Western Asia, is sometimes seen during the summer in South Africa in considerable numbers, both on the coast and far inland, including Karroo dams (2). I have only once seen it locally, however, and a single specimen at that, on 22nd September 1940.

4. **GREY PLOVER.** The grey plover is not uncommon on the coast, and is sometimes seen far inland (1). I have only observed it on three occasions locally, a solitary individual in each case, viz., on 6th January 1938, 11th February 1939, and 19th January 1940, all three birds, of course, being in winter plumage. In April, I have seen grey plovers on the coast which were beginning to show breeding plumage.

5. **CURLEW SANDPIPER.** The curlew sandpiper is stated to be the commonest of the northern migratory waders that visit South Africa, and a few remain for the southern winter (1). Locally, it occurs sporadically from September to February, my earliest date being 11th September and my latest 2nd February. The largest number seen at one time was ten (12th January 1941), and all the specimens observed were in winter plumage.

6. **LITTLE STINT.** Next to the curlew sandpiper, the little stint is said to be the commonest of the northern waders visiting this country (1), but it is by far the commonest locally. It is generally plentiful on the lake during the summer, three hundred odd being the largest number I have seen (near Cape Town it occurs in thousands). It is a fascinating sight to watch flocks of a hundred, or more, of this little wader, often accompanied by a few individuals of larger species, such as curlew sandpiper, swerving and wheeling with precision over the water, frequently returning to settle on the spot from which they took off a minute or two earlier. Courtship has been observed more than once, a bird being seen running forward in a crouching position, with the tail spread out fan-wise, apparently trying to attract the attention of another bird feeding nearby. It would settle for a time, still in the crouching position, and then start running again. The other bird took no notice although the performance was repeated several times. Finally the performer desisted, and commenced feeding. Little stints do not usually become abundant here before October, and their numbers begin to drop by the middle of April. My earliest date is 27th August and my latest 31st May. The latter date is exceptionally late, however, as the species is seldom seen after the beginning of May.

7. **RUFF.** This species has been seen fairly often during the last two years. It was first observed on 10th December 1939, and was present, in varying numbers up to twenty, until 10th January. It was again noted on 4th August, when eight birds were present, and was to be seen, off and on, until 9th February. The largest number observed at one time (2nd February, 1941) was fifty-four, of which five or six were ruffs, and the remainder reeves. This species frequents weedy shores as well as mud ones, and has also been seen on the river below the lake. It is described as being an extremely common migrant from the north (3), and is often seen far from water (2).

8. **COMMON SANDPIPER.** The common sandpiper is a regular visitor to the lake, and usually frequents the lower end where the shores are composed of gravel and stones. It arrives in September and departs again during March or April, my earliest and latest dates being 9th September and 17th April respectively. In 1939, a solitary specimen was noted on three occasions in July, suggesting that some individuals may occasionally remain over for the southern winter. The largest number which has been seen at one time was nine. This species is described as a common migrant to South Africa, frequenting running streams, marshes and flooded areas (3).

9. **MARSH SANDPIPER.** The marsh sandpiper is an occasional summer visitor, having been noted from November to January, but never exceeding three in number at a time. In 1940, two birds were also observed on 28th July. It is described as being not uncommon from September to April, about flooded areas, marshes and coastal lagoons (3).

10. **GREENSHANK.** The greenshank has been described as the most generally distributed in South Africa of the larger European waders on every kind of fresh and brackish water, while a number remain throughout the southern winter (1). At Graaff-Reinet, it occurs mainly as a summer visitor (October to February), but is liable to turn up at almost any time of the year, having also been observed in March, April, July and August. Up to six individuals have been seen at one time.

11. **WOOD SANDPIPER.** This "tame and confiding little wader," as Dr Gill so aptly describes it (1), is generally distributed, occurring singly or in small parties during the southern summer (3). It has been noted occasionally at Graaff-Reinet, from December to February, not more than two being seen at one time.

12. **CURLEW.** The curlew occurs usually as a spring and early summer visitor, especially if there have been winter rains, and there is, in consequence, plenty of green vegetation (coarse grass, rushes, etc.) near the lake shores. We had a wet winter in 1935, and, in the following spring, curlew were present in numbers varying from two to ten from 9th October to 27th November, while one bird lingered on until 16th February. After that date until last spring (1940), curlew were only

seen very occasionally, viz., in 1936, on 5th May, 9th September, and 12th December (one bird only in each case); in 1937, on 10th January and 31st July (again one bird only in each case); in 1938, on four occasions from 17th to 30th October (one to two birds); in 1939, on 13th August (one bird). In all these years there was little, if any, rain during the winter. Last winter, however, we had several inches of rain during the early part of it, and curlew were present from 13th October to 16th February, the numbers being at their peak on 3rd November, when fourteen birds were noted, the largest number hitherto observed here at one time. The curlew is common on estuaries and lagoons along the coast, and some individuals remain throughout the southern winter, but there is no evidence that it breeds in South Africa (3). Those seen in this country chiefly belong to the Eastern race (*lineatus*, Cuv.), which breeds in Siberia (2). It is lighter in colour than the typical western form, so familiar in Britain.

13. **AVOCET.** Although the avocet breeds in South Africa, it is also a migrant from the north, possibly even from Europe, and has been seen in flocks of four or five hundred near Cape Town (1). At Graaff-Reinet, it is most frequently seen during October and November, but has also been observed from June to August upon several occasions, twice in January, and once in April. The largest number seen at one time was forty-five. This was on 12th November 1940, and upon the same occasion one bird was observed swimming. To see a flock of avocets in flight over the lake is something to be remembered.

14. **GREY PHALAROPE.** It was only in recent years that the grey phalarope was for the first time recorded in the South Atlantic (coast of S.W. Africa, 1924), and still more recently from Cape seas (near Cape Town, 1931) (1). I was therefore much surprised, not to say thrilled, to see an individual of this species on the lake at Graaff-Reinet on 9th March last (1940). This bird allowed of my near approach, and I was able to watch it for a long time. Its shape, size, colouring and behaviour were unmistakable, and I am perfectly convinced of its identity. Its remarkable tameness was also characteristic of this species. For a considerable part of the time during which I had it under observation, it was busily engaged in feeding, sometimes paddling, but more often swimming rapidly round in circles on deeper water, pecking at small insects, presumably, on or near the surface. It did not go far if disturbed, and occasionally accompanied short flights of little stints which were feeding nearby. After it had been feeding for some time, the phalarope came into very shallow water, about an inch in depth, and started preening itself vigorously. It was in winter plumage. Mr Vesey-Fitzgerald's description of this dainty little bird as "like a very small pearly-white gull" (4) fitted it exactly. The dark stripe running from the eye towards the nape and the white bar on the wing were very distinct. I have been fortunate in seeing quite a few rare and unusual birds on the lake at Graaff-Reinet, but the grey phalarope

easily heads the list in this respect, being a new record for the Eastern Cape Province. It was one of those rare events of which a bird-watcher dreams, but seldom realizes. Having seen a grey phalarope on the lake, one feels one can expect almost anything.

15. **BLACK-WINGED STILT.** Like the avocet, this species breeds in South Africa, but may also be a migrant from the north (3). It occurs commonly near Cape Town (1), but is stated to be rare in the Eastern Province (2), although Mr H. James, of the neighbouring district of Cradock, tells me that it is a regular visitor to pools in the Fish River there. I had long been anxious to see this bird, and was therefore much gratified to find a pair present on the lake shores on 18th January of this year (1942). The birds were busily feeding, walking about in the shallow water and on the wet mud near the edge. The stilts which breed in this country are not the same as those which do so in the north, and have shorter wings and relatively longer tails than the latter (3).

16. **REDSHANK.** The redshank is a rare migrant in South Africa, having only been recorded on a few occasions, and apparently not at all in the Eastern Province (3). Three were present on the lake shore on 4th January 1942, and were seen in company with three greenshank and a marsh sandpiper. The white hind-margin of the wing was evident in flight. A noteworthy record.

17. **BLACK-TAILED GODWIT.** This species is also a rare migrant in South Africa. One or two birds were recorded on three occasions near Cape Town in November 1939 (Broekhuysen, G. J., and Meiklejohn, M. F. M. "Observations on Palaearctic Waders and European Swallows in the Cape." "Ostrich." Supplement No. 1. October 1941), the only previous records south of Abyssinia being one from Durban and one from Kenya, single individuals in each case. On 11th October 1942 I had a fleeting glimpse of a large water in flight and which in general appearance resembled the black-tailed godwit, but I did not see it long or near enough to be certain. A few days later (14th October), however, I was fortunate in seeing the bird again, and this time was able to approach within thirty yards without disturbing it. It was in company with several avocets and a greenshank, so I had an excellent opportunity of observing its size as compared with these other species. It obligingly allowed me to watch it for some time before flying off, and I was thus enabled to observe it standing, walking, and in flight. There was no mistaking the broad white wing stripe, the black and white tail, and the long and somewhat massive, slightly up-curved bill, reddish in colour and black towards the tip. The bird was in winter plumage. It had disappeared when I visited the lake again a few days later, so I was really fortunate in seeing it and in securing such a notable record.

18. **SANDERLING.** Described as a rare migrant by Roberts (3), the sanderling has been recorded from the east coast (2) and near Cape

Town (1), but there do not appear to be any records of its occurrence inland in South Africa. I was therefore much surprised and pleased, while walking along the lake shore on 3rd November of this year (1942), to see a party of six sanderlings running along at the edge, where a strong wind was causing the water to break in waves. I have seen several of the birds upon more than one occasion since, and have obtained near and excellent views of them feeding, at rest, and in flight, and have also heard the note uttered in flight. All were in characteristic winter plumage, while the running attitude and note were also unmistakable.

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- (1) Gill, E. Leonard. "A First Guide to South African Birds." Cape Town, 1936.
- (2) Hewitt, John. "A Guide to the Fauna of the Eastern Cape Province." Part I. Grahamstown, 1931.
- (3) Roberts, Austin. "The Birds of South Africa." London and Johannesburg, 1940.
- (4) Vesey-Fitzgerald, Brian. "A Book of British Waders." London, 1939.

APPENDIX.

Scientific names of species dealt with in foregoing paper, as given in "The Birds of South Africa," by Dr Austin Roberts:

1. *Arenaria interpres*, Linn.
2. *Charadrius hiaticula*, Linn.
3. *Eupodella asiatica*, Pall.
4. *Squatarola squatarola*, Linn.
5. *Erolia testacea*, Pall.
6. *Pisobia minuta*, Leisl.
7. *Philomachus pugnax*, Linn.
8. *Actitis hypoleucos*, Linn.
9. *Numenius stagnatilis*, Bechst.
10. *Glottis nebularius*, Gunn.
11. *Rhyacophilus glareolus*, Linn.
12. *Numenius arquata*, Linn., subsp. *lineatus*, Cuv.
13. *Recurvirostra avosetta*, Linn.
14. *Phalaropus fulicarius*, Linn.
15. *Himantopus himantopus*, subsp. *meridionalis*.
16. *Totanus totanus*, Linn.
17. *Limosa limosa*, Linn.
18. *Crocethia alba*, Pall.

A BRIEF INTRODUCTION TO THE STUDY OF CHALCIDS.

By B. S. DOUBLEDAY.

Read 13th August 1942.

It seems to be a general complaint amongst those entomologists who have undertaken the study of any particular group of insects that those forming the subject of their investigations have been neglected to a greater extent than any others. That a good case might be made out in this respect with regard to Chalcids, at all events so far as the taxonomy of the British species is concerned, is sufficiently indicated by the fact that the first attempt to describe any considerable number of these insects was also the last. Francis Walker, after dealing with several genera in a series of articles called *Monographia Chalcidum* in the "Entomological Magazine" in the years 1834 to 1837, supplemented these by the publication of "*Monographia Chalciditum*" in 1939. This was in two volumes, the second of which, it is interesting to note, relates to the species which had been collected abroad by Charles Darwin. All these descriptions are in Latin, and although many of Walker's names are still in use, the majority of subsequent workers have failed to reconcile his descriptions with the insects they have had before them. About the same time as Walker's work was published Westwood and Haliday were devoting a good deal of attention to the family, and several of their genera are also current, but their descriptions are scattered through the periodical literature of the day, and, in accordance with the practice then prevailing, they were addressed to their contemporaries in Europe rather than to their less learned posterity in their own country. In his well-known "Introduction to the Modern Classification of Insects" Westwood has some rather interesting remarks as to the habits of the family, and his Synopsis at the end of volume 2 of that work is still referred to occasionally as an authority. Since this outburst of enthusiasm, more than 100 years ago, practically nothing has been done in this country by way of revision.

The next two writers to whom reference must be made are Foerster and Ratzeburg, whose main works appeared between the years 1840 and 1856, and if their descriptions are not always adequate we do at least owe much to them for their contribution to our knowledge of the habits of the insects they described, a distinct advance on Walker's constantly recurring phrase "in grass near London." Ratzeburg approached the subject entirely from the point of view of a forester, and confined himself to such species as are parasitic on insects affecting trees. It is interesting to note that both of these writers refer to the family as *Pteromalids*, all their species being grouped round the old genus *Pteromalus* (Swederus, 1795), which is now regarded as having a much narrower

application, although it forms the basis of the family *Pteromalidae*, which is in many respects the most characteristic, as it is in all respects the most difficult, of all the families into which it is now customary to divide the Super-family *Chalcidoidea*.

The next work of any importance is Thomson's "Skandinavien Hymenoptera," volumes 4 and 5, which, relating to "*Pteromalus*," still of course in the wide sense, were published at Lund in 1875 and 1878 respectively. The descriptions are in Latin, with elucidatory remarks, including notes as to affinities, in Swedish. This author undoubtedly marks a great advance in the scientific arrangement of the species.

Apart from the work of Mayr, which is referred to later under the families with which he more particularly dealt, nothing of importance then appeared until Ashmead published in 1904 his "Classification of the Chalcid Flies" as a Memoir of the Carnegie Museum, Pittsburg. This represents an attempt to re-arrange all the genera, with sub-division into families and tribes, and it forms the foundation of the volume published by Wytsman in 1909 in the "Genera Insectorum," which was compiled by Schmiedeknecht, who appears to have had no special knowledge of the family. His work, however, comprises a description of all the genera throughout the world and a list of all species, most, if not all, of which may also be found in Dalla Torre's "Catalogus Hymenopterorum," 1898. Mention may also be made of an extract of all the British species which was made from this work, and published in 1910 by the British Museum under the title "Catalogue of British Hymenoptera of the Family *Chalcididae*," mainly useful as a guide to the original descriptions, the vast majority of which are still awaiting confirmation. No attempt was made to bring the old method of classification into line with Ashmead's re-arrangement, and its effective date must be taken as being 1898.

If we exclude the family *Mymaridae*, sometimes referred to as "Fairy Flies," the *Chalcidoidea* forms a fairly homogeneous group, mainly characterised by the much reduced venation of the wings, comprising a single vein running from the base of the wing for a varying distance immediately below the front margin, with which it then unites and follows, also for a varying distance, and ultimately emits a short branch, at the end of which is a more or less pronounced knob or stigma. The point where this branch leaves the margin sometimes marks the end of the marginal vein, which is, however, occasionally continued. It will be seen from this that there are no cells, but, slight as the wing venation is, it affords some very useful characters for the purpose of classification, as in other sections of the Hymenoptera. These remarks, it must be understood, apply only to the forewing. The hindwing contains a single vein, which varies slightly, but has been little used in systematics. It may be found to deserve more attention in this respect than it has hitherto received. Wing markings and cloudiness, local and general, occur, but are not very frequent, the normal wing being hyaline. Another distinctive feature of the family, perhaps not quite so obvious, is

the fact that the pronotum does not extend to the insertion of the front wings. The wing venation of some of the Proctotrypids is similar to that of the Chalcids, but these insects are all black, and, apart from the distinctive formation of their legs, the females differ in having the ovipositor at the end of the abdomen, instead of in the middle as is the case with the Chalcids. This is sometimes not very apparent owing to the sheath or guides of the ovipositor being pressed closely to the lower portion of the terminal segments of the abdomen when the insect is at rest. As is well known, most Chalcids are remarkable for their more or less brilliant metallic colouring, but there is quite a sprinkling of black forms, and a few even of the reddish-brown shade which is more familiar amongst the ants. Although the apterous condition is probably not so frequent as in some other families of the parasitic Hymenoptera, many wingless species are known, as well as intermediate forms with much abbreviated wings, and it is interesting to observe that in these latter cases where the forewings are reduced to mere stumps the remains of the typical venation can still be traced.

In the perfect state these insects are slow and deliberate in their movements, and may frequently be seen leisurely crawling about on the windows of houses, occasionally indulging in leaps, from which they alight in a somewhat surprising manner on the vertical surface from which they had taken off. A fair number hibernate in the adult stage, and will remain alive many months without food through the winter. Some of these hibernating species occasionally enter houses in very large numbers, often accompanied by the host on which they have bred. A curious habit may sometimes be observed of crawling in a direction at variance with that in which the main axis of the body is pointing. Occasionally the ruse of feigning death is adopted to avoid capture.

In the matter of size it must be confessed that the family is not impressive so far as the individual is concerned, although it may be admitted that the fact is in itself somewhat impressive that three or four may find sufficient nutriment and accommodation in the egg of a beetle to enable them to complete their development. The maximum number to emerge from the egg of one insect is reported to be seventy-five. This surely is a record which would not easily be exceeded. What David Sharp called "the giants of the section," the *Leucospidae*, are not likely to be found in this country, where species measuring as much as one-quarter of an inch are exceptional.

Before leaving the consideration of the adult stage, a habit of feeding which has frequently been observed may be mentioned. This consists of puncturing the host by inserting the ovipositor and sucking the contents of the body through the hole thus made, an operation which is probably attended with fatal results to the insect attacked; but oviposition on this particular victim does not necessarily follow, although cases are known where this practice by the parent has deprived her offspring of the nourishment required for its full development. Where the host is a larva or a pupa lying within a cocoon a feeding tube is said to be

constructed by some Chalcids for the purpose of obtaining the required juices of the inmate.

Interesting as these insects are in the perfect state, with their brilliant colouring and startling modifications of structure, it is perhaps from the biological standpoint that they present the most striking features, and much as we have to deplore the extent to which their systematic arrangement has been neglected, the same complaint is not altogether valid with regard to their life-history, and some species have received so much attention that the resulting papers would furnish matter for a volume of goodly proportions. This is almost entirely due to their importance from an economic point of view. These intensive studies have, however, been restricted to comparatively few species, and there is still very much to be learnt, particularly in respect of those which have not attracted attention on account of their influence on the affairs of men.

In the matter of sex, some species have been bred through several generations without mating, but even if parthenogenesis may prove to be obligatory in a few instances, it must be regarded as the exception rather than as the rule. The number of the females sometimes preponderates very heavily, but there is much variation in the degree of disparity in the number of the sexes. The great majority are parasitic in habit, but there are notable exceptions, some few having even been advanced to the dignity of "pest," chief amongst which, perhaps, so far as the literature is concerned, is the genus which is known in America as *Harmolita*, of the family *Eurytomidae*, the larvae of which feed in the stems of corn and grasses, and have received the name of "joint worms," based presumably on their habits rather than on their structure. Other phytophagous species are to be found in seeds, where they have on at least one occasion occurred in such profusion as to cause alarm. It is, however, in the parasitic rôle that they excel; but here again they can by no means be regarded as an unqualified blessing to mankind, owing to the habit of hyper-parasitism which they have occasionally developed. Sometimes, for instance, one species may be found destroying another which may be engaged in the good work of keeping within bounds some pest or other; and as such a secondary parasite in one place may be elsewhere performing usefully as a primary parasite, the position tends to become somewhat involved. It is a sad reflection that considerations of utility should be essential to promote the study of operations of this nature, which ought, at least to the amateur, to be sufficiently attractive in themselves as a subject of investigation. Cannibalism is not unknown, but it may be accidental as no doubt many instances of hyper-parasitism are as well.

There are undoubtedly indications that one species of Chalcid may limit its attack to one particular host only, but as our knowledge grows it tends to show that this is unusual. At the same time it cannot be doubted that some species are much more comprehensive in their tastes than others, and if analogy is to be trusted the more successful kinds will prove to be those which have been able to adapt themselves

to a varied diet. This forms part of the large subject of Host Selection in which very little has been done in co-ordinating the published material which is available. Another interesting question which is intimately connected with this subject is that referring to the means at the disposal of the parasite for locating its host when this is another parasite in the form of a larva buried within the body of the larva which it in turn is attacking.

One of the most consistent features in the life-history of these insects is the fact that pupation is effected without spinning a cocoon, the usually black, shining pupa being found loose within the host, or in some cases even outside in the open if the larva has left the host before pupation. To this rule exception seems to have been found so far in one genus only. The most remarkable phenomenon in development is undoubtedly that which goes by the name of polyembryony, as a result of which many embryos develop from a single egg, so that several hundred individuals may emerge as perfect insects from the body of a caterpillar, the egg from which this developed having had only one egg deposited in it by the parasite. A fairly extensive literature has grown up round this subject in recent years, and many interesting papers are available for those who may care to pursue the question further.

It has already been mentioned that some of the smaller species complete their development within the egg of other insects, but there is no stage which is not subject to attack, although outside the Homoptera there are very few records of oviposition by the parasite in the adult stage of the host. I have myself reared one Pteromalid from a larva which I found apparently feeding on a Cynipid imago in an oak gall, the dismembered remains of which were the only other contents of the gall. It would not, however, be safe to draw any definite conclusion from this until further evidence is forthcoming, as the situation may have resulted from the abnormal development of the host, for it is well known that members of the *Cynipidae* are very erratic in the period of their development. It has, moreover, been observed that attacks by parasites may have the effect of accelerating the development of the host, although, naturally, the normal effect is to retard or arrest it. Nevertheless, even in the times of Ratzeburg there were a few records of Chalcids bred from the adult stage, and not so many years ago an account was given of a species which attacks a wood-feeding beetle while the latter is in the act of boring. One rather interesting problem in the case of attacks on the earlier stages of the host is that connected with the determination by the female parasite of the appropriate number of eggs to be deposited commensurate with the amount of food which is likely to be available for the offspring. If the number is too great it is obvious that there is a danger of starvation, as the larvae have no means of moving off to other sources of supply. The situation is met in some cases by the survivors consuming the bodies of their weaker brethren, but occasionally the result is a larger number of smaller individuals. The reverse condition is not necessarily favourable,

as it has been shown that where the food supply is excessive, the larvae may perish by the simple process of drowning, as it is only in their earlier stages that their respiration is adapted to the liquid medium in which they are immersed. This naturally only applies to those species which are internal parasites, and which are mainly to be found on hosts feeding in the open, the external parasite being usually but by no means always associated with such larvae as spend their lives under cover: in this category must be included the pupae of Diptera in the puparium, as it has been noticed that such species of Chalcids as attack the dipterous puparium will sometimes not oviposit until the contraction of the contained larva has given rise to a space between its body and the wall of the puparium. This and similar observations tend to produce the conviction that the Chalcid ovipositor, in addition to being a very efficient implement, is an extremely sensitive instrument of investigation, and for those whose interests lie in the microscopic structure of insects there are few objects that would better repay examination. In some few cases the need is dispensed with for the female to locate precisely the situation of her victim: this happens where hyper-metamorphosis prevails and the first larval instar bears little resemblance to those which follow. In the few instances of this kind which have been recorded the egg is merely deposited in such places as are frequented by the host, the larva which issues being an active creature, left to its own devices to find a suitable host. It appears to be provided with very feeble powers of discrimination in this respect, and mortality must be extremely high, a contingency which is no doubt met, as in analogous cases amongst plants and fish, as well as amongst insects, by the extraordinary fecundity of the parent. This active larval form, which has received the name of planidium, has its chances of success still further reduced when the only host in which it can develop is to be found inside a larva which already contains the egg or larva of another parasite. Its one qualification for this rôle is said to be that it has the power to live without food for a comparatively lengthy period.

Only a few of the ways of life of these insects have been briefly indicated, but it is hoped that they are sufficient to show that the family is worthy of further investigation. It is not necessary to go far in order to make fresh discoveries, and of the multitude of problems that still remain to be solved the following may be mentioned by way of illustration. The common laburnum is fed upon by at least three species of leaf-miner, the very common *Leucoptera laburnella*, known to all students of the "micros," and two species of *Agromyzidae* amongst the Diptera. Of all the parasites, and there are many species, primary and secondary, which emerge from these mines, are there any which attack all three, or are some restricted to one or both of the dipterous hosts, or to the moth? There is another species of *Leucoptera*, which, I believe, only a very expert eye can distinguish from *L. laburnella*, and which is to be found mining in stems of broom. Has this species its own special complex of parasites, or does it provide accommodation to

any of the species which are to be found in its congener, so similar in form and yet different in its habits? I wonder how many lepidopterists, who might assist in answering questions of this kind, have thrown away in not unnatural disgust the parasites which have destroyed the form that they were so anxious to preserve; and, after all, what else could they do with them in a country where, as a Frenchman once told Foerster, the study of these insects had become a "science toute anglaise," but where the "science" has been allowed to sleep almost entirely undisturbed, for over one hundred years?

The following key to the families is adapted and somewhat abbreviated from Schmiedeknecht's "Die Hymenopteren Nord- und Mittel Europas," omitting those which are not likely to be found in this country. The second edition of this work appeared in 1930, and contains the only brief guide in existence to all the European genera. The definitions of these are, however, far from adequate, and no reference is made to genera which had been erected after the author's more extensive account of the family published in 1909. For this reason it was not included in the short list of references appearing above. Moreover, it forms but a small part of a large work comprised in a somewhat formidable volume, dealing at greater length with some of the other members of the Hymenoptera.

KEY TO THE FAMILIES.

1. Front tibiae armed at the apex with a large curved spur. Joints of the antennae numerous but not exceeding 13. Radial nerve generally rather long. Tarsi 5-jointed.
 - (a) (Thomson's Section I—Macrocentri) 2
 Spur of front tibiae short and straight. Tarsi 4- or 3-jointed. Radial and post-marginal nerve, often short, the latter sometimes absent.
 - (b) (Thomson's Section II—Microcentri) 10
2. Posterior femora much thickened, generally heavily serrate below. Hind tibiae much bent and inflated; tarsi inserted towards the apex. Posterior coxae very long. No European species with metallic colours *Chalcididae* 3
 Legs lacking these distinctive features
3. Abdomen often triangular, the main portion being occupied by the 2nd and 3rd segments. Species generally with coarse and deep sculpture *Perilampidae* 4
 Radial nerve short
4. Hind coxae generally five or six times longer than the front coxae, triangular in section or at least with sharp margin. Radial nerve so short that the stigma is almost sessile on the marginal vein. Ovipositor nearly always protruding and often very long *Torymidae*
 Hind coxae not conspicuously large, ovipositor rarely protruding, and radial nerve not excessively short 5
5. Pronotum unusually large 6
 Pronotum not excessively developed 8
6. Pronotum rectangular. Abdomen of female rounded or oval, somewhat compressed laterally, the last segment prominent. Black species without metallic reflections *Eurytomidae* 6
 Large species with metallic colouration

7. Pronotum long and narrow towards the front. Abdomen flattish above. Front or back femora enlarged or hind legs long	<i>Cleonymidae</i>
8. Sides of thorax raised to form a shield-like covering. Middle tibiae armed with a long, strong spur, sometimes widened at its base	8
Sides of the thorax showing the usual sutures	9
9. Marginal nerve long. Mesonotum depressed. Abdomen generally long	<i>Eupelmidae</i>
Marginal nerve very short, generally forming a mere point where the vein just touches the front margin of the wing before branching to the stigma. Abdomen generally depressed, and often very small	<i>Encyrtidae</i>
10. Hind tibiae with two spurs	<i>Miscogasteridae</i>
Hind tibiae with only one spur	<i>Pteromalidae</i>
11. Tarsi with 4 joints, rarely five	<i>Eulophidae</i>
Tarsi with 3 joints	<i>Trichogrammatidae</i>

Chalcididae. There is no fear of mistaking members of this family, with their very large femora, giving the insect a somewhat extraordinary appearance. Although some species are known to attack very common representatives of the Lepidoptera, they do not appear to be particularly prolific as individuals, nor are the species very numerous with us, and they are not very frequently found. Perhaps they have outlived the purpose for which their legs were modified.

Perilampidae. This family is more remarkable for the nature of the development of some of its species than for the number of genera it contains. The larvae of *Perilampus* are of the planidium type.

Torymidae. This name is still used in Europe, but *Callimomidae* has now been adopted for some years in America. There are not many genera, but the species are numerous and frequently met with. The paper by the Austrian Gustav Mayr in 1874 would make a very good starting point for a special study of this family, which contains some rather large and very beautiful species, which may often be seen investigating the numerous galls which are to be found on oaks. In fact their favourite hosts are galls generally although some are plant feeders and may be bred from seeds, the most common being found in the seeds of roses. These are yellow and black species of the genus *Megastigmus*, but most members of the family are blue, with very pronounced metallic reflections, and are readily recognized by the projecting ovipositor, which is sometimes as long as the body of the insect.

Eurytomidae. This is a fairly well-defined family, nearly all the species of which are black. They are, however, of extremely diverse habits, some being phytophagous, including a few gall-producers, others are parasitic, and the habit of combining both methods of feeding has been recorded. The "joint-worm," which belongs here, has already been mentioned. The majority of the species of this family are readily recognised by the well-developed, square pronotum, the deep sculpture of the thorax and shining black abdomen. The males are remarkable for the

shape of the segments of the antennae. There are few genera included in the family, the chief one being *Eurytoma*, the species of which are fairly common.

Cleonymidae. This is another small family of large, rather conspicuous species, some of which, with banded wings, are liable to be mistaken at first glance for Braconids. There is not full agreement as to the genera which should be included in the family. The little that is known as to their habits seems to indicate that their chief victims are beetles.

Eupelmidae. This again is not a large family, although some of the members of it are of a good size, and a few are fairly frequent.

Encyrtidae. This is a very extensive family containing a large number of forms remarkable for the diversity of their colouring and structure amongst a still greater number of more sombre appearance. Their habits are equally diverse, for whereas the *Coccidae* are most frequently attacked, hosts are also provided by the Lepidoptera, Coleoptera and Diptera, and even the Neuroptera, an order which otherwise seems to be extremely free from parasitism by the Hymenoptera. The variation in size is considerable, tending, however, towards the lower limits, the species which develop in the eggs of other insects being naturally amongst the smallest. The eggs of the *Encyrtidae* present certain interesting features, inasmuch as while some of them are provided with a long stalk, others have been shown to increase considerably in size after being deposited, apart from the phenomenon of polyembryony which has been referred to above. The old Genus *Encyrtus* (Latreille 1809), which formerly contained a very large number of heterogeneous elements, has been brought into some sort of order and divided into a number of genera by Thomson and by Mayr, who gave a very excellent account of them about the same time; and in 1921 R. G. Mercet's description of the species found in Spain was published by the National Museum of Natural Science, Madrid. This book, it is interesting to note, containing as it does 732 pages and 292 very well executed figures, represents the most ambitious attempt that has ever been made to describe in detail any section of the *Chalcidoidea*. The author makes no claim that his work should be regarded as a monograph of the family. It seems to deserve more attention than it has received.

Miscogasteridae. A considerable number of genera are included here, but they are not very rich in species. Ashmead assures us that the existence of two spurs on the posterior tibiae is a very good character by which the family may be separated from the *Pteromalidae*, but it is one which is very difficult to be certain about in many cases, even when the higher powers of the microscope are applied. The majority of the species have not received much attention, and very little is known as to their habits.

Pteromalidae. This difficult family comprises a very large number of genera, some of which contain many described species. The old genus *Pteromalus* has been divided to such an extent that it is rather difficult to decide what characters still remain to distinguish it. Many British species now fall into genera which have been erected in America, where an honest and we may hope successful attempt is being made to work out the synonymy of several species and to connect with Walker's descriptions. This operation is not limited to the present family, but it is here that the greatest scope appears to present itself in this respect. In order to indicate the difficulty of finding characters on which genera may be satisfactorily established, it may be mentioned that after Ashmead had founded two whole tribes on the possession of four teeth in the right mandible and three in the left, we find Masi in Italy describing two species of the same genus, one with three and the other with four teeth in the left mandible, and still later, in Russia, Kurdjumov states that he has found the number of teeth to vary within the limits of a single species. This inequality in the number of teeth turns up again in the *Miscogasteridae*. In fact, one of the most striking features in the morphology of the Chalcids is the occurrence of unusual modifications of structure which one might be tempted to regard as typical of a single genus, but which are liable to appear in other genera only distantly related, and as this peculiarity on at least one occasion caught Westwood napping, it is not impossible that the Russian fell into the same trap, although it must be admitted that he had a fairly extensive knowledge of the family. The *Pteromalidae* probably represent the most typical family of the *Chalcidoidea*, and its members are of the most varied habits, hosts being afforded by most of the leading orders of insects, some species being parasitic on gall-producers.

Eulophidae. This family is based on the old genus *Eulophus* (Geoffroy 1762), the "well-plumed" character of the male antennae being responsible for the name. These antennae with their remarkable branches, resembling the antlers of a stag but much larger in proportion, are one of the most striking features of some genera, although there are many others where the antennae are quite normal. Some of the genera are represented by a single species, not an uncommon occurrence amongst Chalcids generally, while others, such as *Tetrastichus* and *Entedon*, contain an alarming number, the naming of the majority of which is a fairly hopeless undertaking. The family comprises some very beautiful forms, but most of them are small. Their habits are varied, some being egg-parasites, others attacking gall midges, many with a marked preference for leaf-miners, not only of the Lepidoptera and Diptera, but also of the Coleoptera, while not a few are hyper-parasitic. It is rather interesting to find that this family is exceptionally well represented in Australia, where some species have acquired the habit of forming galls.

Trichogrammatidae. This family is very well-defined, but is represented by a few genera, which so far as is known at present, are egg-

parasites, and are not likely to attract much attention by the casual observer owing to their small size, some species being well in the running for the distinction of being the most diminutive of insects.

Both Ashmead and Haliday considered that the *Mymaridae* should be included with the Chalcids, but there is much to be said in favour of placing them in a family to themselves. Should it be thought necessary to group them there seems to be ample accommodation amongst the heterogeneous collection of forms which are comprised in the superfamily *Serphoidea*, more familiarly known in this country as *Proctotrypidae*.

NOTES ON COLLECTING SPECIES OF THE GENUS ELACHISTA, TREIT.

By L. T. FORD.

Read 10th September 1942

Until a few years ago the only representatives of this interesting genus in my cabinet were three or four of the commonest species—*cygnipennella*, Hb., *rufocinerea*, Haw., and *albifrontella*, Hb. I seldom had the opportunity of collecting at the time of flight, usually in the late afternoon, and it was not until I had learnt something of the larval habits that I was able to add other species to my collection. Imagines are on the wing for a very short time and will not fly at all if there is much wind.

One could hardly fail to miss *cygnipennella*, which occurs in vast numbers on the Thames salt-marshes and elsewhere and is very conspicuous in flight or at rest on stems or blades of grass, or *rufocinerea* (which has a longer period of flight than other species of this genus) flying over the herbage at the edge of a ride in almost any wood. Both of these species are abundant and can easily be obtained in good condition; most other species, when taken on the wing, are generally in poor condition as imagines readily lose the cilia and scales of the forewings. The difference between a series of bred and caught *cerusella*, Hb., is very striking; the late Bishop of Ipswich, when he saw my series of this species, did not recognize them although he had a series of caught specimens in his collection.

Larvae of this genus are extremely easy to rear and I recommend that one should obtain his specimens in this manner. The method I adopt is to keep the tenanted leaves or blades of grass in a small bottle of water, which is placed in a cylinder of suitable size made out of a sheet of celluloid, fitted on to a shallow round tin, the top of the cylinder being covered with muslin or gauze. Some food plants, e.g., *Aira caespitosa* and *Luzula*, seem to keep fresh for a longer time if the stems are inserted in damp sand instead of water. Fresh food can be added from time to time as the larvae of most species readily enter fresh leaves. In the case of larvae which hibernate and feed again in the Spring it is better to gather the rootstock of the tenanted leaf, which should be planted in a flower-pot and kept out of doors during the winter.

When I first tried to find larvae of this genus I searched the food plant growing in the open and it was a long time before I found even a single larva. I have since ascertained that the larvae of most species are only to be obtained in any number in sheltered situations, e.g., under a bush or at the bottom of a hedge. Even those species which frequent downland seem to prefer the shelter of a tussock or ant-hill. On Portland Bill I found numbers of larvae, mainly of *cygnipennella*, feed-

ing in blades of grass growing at the foot of the large rocks which lie scattered over the Bill. Elsewhere I could only find an occasional larva.

The following are some of the more local species, the larvae of which I have been successful in finding:—

E. cinereopunctella, Haw. The larva feeds in the leaves of *Carex glauca*, making a long narrow mine, and pupates at the extreme base and on the upper side of the leaf, usually the leaf on which it has fed. This species is plentiful at Riddlesdown and should be looked for on the *Carex* growing under bushes or clumps of bushes, although an occasional larva or pupa may be found in the open.

E. magnificella, Haw. This beautiful species is fairly plentiful in the woods near my home, the larva feeding in the leaves of woodrush—*Luzula sylvatica* and *L. pilosa*—mining upwards. The mine is inflated and somewhat resembles the mine made by species of *Lithocolletis*. The larva can be found from early in April to the middle of June and should be looked for on plants growing amongst brambles or under trees. It is rarely to be found on plants growing in open parts of a wood. The larva pupates at the extreme base of the plant or on some dead vegetation nearby.

E. poae, Staint. The mine of this species is not easy to see, being only slightly lighter in colour than the leaf. The larva makes a long narrow mine in the blades of *Poa aquatica*, mining downwards, sometimes into the stem. When full fed it wanders some distance before spinning up to pupate.

E. perplexella, Staint. On the 10th of May last year I found the larva of this species in large numbers feeding in the leaves of *Aira caespitosa* growing in the wood on the north bank of the river Lune within a mile of Caton, as many as a dozen on a single clump of the grass. The larva feeds in the tip of the leaf, mining downwards for about two inches, eating the parenchyma on both sides of the central membrane. The white tip of the mined leaf is conspicuous. The pupa is attached to a dead leaf of the grass and is difficult to find.

E. zonariella, Tengst. This is another species feeding on *Aira caespitosa*. The larva feeds in the tip of the leaf, eating the parenchyma on the underside of the central membrane, so that the mine is scarcely perceptible from the upper side; one has to turn over the leaves to find it. This species occurs at Ashted in the open ground between the station and the woods, more plentifully on the clumps of *Aira* growing amongst the bracken or at the edge of a thicket.

E. megerlella, Staint. Larvae of this species were abundant in the same locality as *E. perplexella* about a month later, also feeding on *Aira caespitosa*. The larva mines downward from the tip of the leaf, eating the parenchyma on the upper side of the central membrane, so that the mine is not easily perceptible from the underside of the leaf. I also found the larva of this species in the early part of April of this year feeding on *Sesleria caerulea* growing in the two to three feet deep crevices in the limestone rocks on Warton Crag near Carnforth. The

larvae were mining downward from near the tip of the leaf, making a narrow mine on one side of the midrib. I could not find any larvae on the grass growing on the surface. The second brood, feeding on *Brachypodium sylvaticum*, mine upwards.

E. taeniatella, Staint. In September and October 1941 the larvae of this species were plentiful at Thrang End, near Silverdale, feeding on *Brachypodium sylvaticum* growing at the edges of a footpath through a wood. The larva makes an irregular mine, not reaching the edges of the leaf, mining downwards. It hibernates in the mine which it leaves in April to pupate on some bit of dead vegetation. The moth emerges about three weeks later.

E. paludum, Frey. I found a small number of larvae and pupae of this very local species on some boggy ground near my home. The larvae were making long mines in the leaves of *Carex paniculata* growing under alder trees. The larva does not pupate on the mined leaf but wanders away and spins up on a dead leaf of the food-plant. All the pupae which I found were in a horizontal position.

E. scirpi, Staint. The larva makes a fairly long mine in the leaves of *Scirpus maritimus*, mining up or down, the mine being yellowish in colour. It pupates at the base of a leaf in the angle formed by the leaf and the leaf-stalk, sometimes on the plant on which it has fed, but never on the mined leaf. At least I have not seen a pupa on a mined leaf. Imagines and pupae were very plentiful on the saltmarsh between Carnforth and Silverdale in July 1941, but over 80% of the pupae which I collected produced small Braconids.

E. cerusella, Hb. The larva of the first brood feeds in the leaves of Reed Canary Grass (*Phalaris arundinacea*), making a large white blotch in the centre of the leaf, and pupates almost invariably on the leaf on which it has fed, either above the mine or more usually below it, in the angle formed by the leaf and leaf-stalk. The larvae of the second brood feed also on the leaves of the common reed—*Phragmites communis*.

E. subalbidella, Schlag. In September 1941 I was lucky in finding the larvae feeding in the leaves of *Molinia caerulea* and other broad-leaf grasses growing on a "Moss" near Whitbarrow Scar, the clumps of grass growing under trees or bushes being the most productive. The larva makes a broad mine about midway between the rootstock and the tip of the leaf, mining downwards. It is full-fed towards the end of September and hibernates in the mine. In April of the following year it leaves the mine to spin up for pupation on a dead leaf.

During the previous May I had taken several imagines by beating the small birch bushes growing on the Moss. After about 11 a.m. (S.T.) the moths seem to go to ground as I could beat out none after this time.

INTRODUCTION TO A DISCUSSION ON THE LITHOSIINAE.

By BARON DE WORMS, Ph.D., F.R.E.S.

Read 9th January 1943.

The group of the Lepidoptera we have under discussion to-day is popularly known as the "Footmen" moths, a name usually attributed to them owing to the curious straight and stick-like posture these insects assume when at rest. Before going into their natural history, something should be said of their Nomenclature and Classification, about which there is a good deal of difference of opinion, if not confusion, among the various leading authors.

For instance, Seitz in the Palaearctic portion of his "Macrolepidoptera of the World" under the heading of *Lithosiinae*, places these moths in Group 2 next to the *Nolinae* in the larger family of Arctiids, and under the same category includes all the Tigers and Ermines as well as the Footmen. He mentions the existence of 250 recognized genera of the *Lithosiinae*, comprising some 1000 species. Kirby in his "Butterflies and Moths of Europe" also places the *Lithosiinae* immediately after the *Nolinae* and before the Tigers, while Barrett in his monumental work "The Lepidoptera of the British Islands" adopts a similar course to Kirby, describing the *Lithosiidae* as Family VI of the *Bombycina*. South on the other hand puts the Footmen moths right at the end of the Bombyces, as a sub-family of the Arctiids and somewhat far removed from the *Nolidae*, whereas Meyrick places the group at the head of the whole of our Lepidoptera. It will be seen that there is no final agreement where these moths should come in the general classification. There are three species on our list under the name of "Footmen," viz., *Coscinia cribraria*, L. (the Speckled Footman), *C. striata*, L. (the Striped Footman), and *Deiopeia pulchella*, L. (the Crimson-speckled), which all the authors rightly put among the Arctiids proper, as we shall see later, so that they hardly come within the scope of this discussion.

As to the Natural History of this group, we are familiar with the curious build of these insects with their short stumpy bodies and on the whole very frail structure, with their narrow forewings and voluminous hindwings, which fold up in a characteristic manner when the insects are at rest and which, in the majority of the species, are yellow or orange. But the family as a whole exhibits exceedingly little variation in individual species and this feature is in sharp contrast to most of the other Bombycid moths. Unlike most of the Arctiids the antennae of both sexes of the *Lithosiinae* are smooth, none of those in the male being pectinated. This character at once distinguishes *Coscinia cribraria* and *C. striata*, in both of which the male antennae have pectinations, while the larva of these two species and that of *D. pulchella* feed

on low plants, a fact which separates them from the true *Lithosiinae*, the most important characteristic of which is that the larvae feed exclusively on various kinds of lichen and this is without exception so far as our species are concerned. As to the relationship between the *Lithosiinae* and the *Nolinae*, there seems to be very little in common, except that a few of the latter group feed on lichens. The larvae of the "Footmen" are in appearance possibly closer to the *Nolinae* than to the *Arctiids*, being clothed with short hairs, usually in small tufts, and all pupating in frail cocoons. They are for the most part very difficult to rear from ova, which are, as a rule, round and laid in flat batches. All save two of our species, *Atolmis* (*Lithosia*) *rubricollis*, L., and *Eilema* (*L.*) *sororcula*, Hufn., hibernate when young and seldom get through the winter in captivity. I remember it was considered quite an achievement when Mr C. N. Hawkins bred a fair proportion of *Mitochrista miniata*, Forst., right through from the egg. When obtained in the spring the larvae can usually be bred through on withered lettuce leaves. Unless the requisite type of lichen is in just the right state of humidity, the larvae of the "Footmen" seldom thrive. This is particularly the case with the smaller species such as *Nudaria mundana*, L.

With regard to the habits and habitats of the imagines, the majority of the *Lithosiinae* belong to the southern area of the Palaearctic region. Seitz in this portion of his work describes 60 species in the genus *Lithosia* alone. They extend to some of the tropical parts of the Old World. They are especially numerous in Madagascar, but are not met with in the Americas.

The insects are as a rule sluggish by day with the possible exception of *Cybosia* (*Setina*) *mesomella*, L. At dusk they become very active and after dark come freely to light and are sometimes even attracted by sugar. The Family is also characterized by years of extraordinary abundance, when many of the species swarm. The last such occasion was in 1938, the season which had such an abnormally early and warm spring, a factor which had no doubt some exceptional effect on the lichens as well as on the larvae just coming out of hibernation.

Having made these introductory remarks, which I know will be supplemented by other speakers, I thought it might be appropriate to give some brief notes on each of our sixteen species of the *Lithosiinae*, some of which are exceedingly local. I am taking them in the order in which Barrett describes them under five genera.

Under *Nudaria* he begins with the two smallest members of the group, *Comacla* (*N.*) *senex*, Hb., and *N. mundana*, L., the "Muslin" footmen. The former is always associated with marshy ground and though it is commonest in the Fens, such as Wicken, it is found sporadically all over England as far north as southern Scotland. Not much is known about its earlier stages, the larvae probably feeding on lichens on mosses in marshes. It flies throughout July, but the female is seldom met with. *N. mundana*, on the other hand, is a dry-land insect, frequenting downs and open country in late June. Its range extends to the Lake District.

Larvae can be found in numbers in May feeding on small lichens growing on stone walls.

Closely allied to the above two insects is *Setina irrorella*, Clerck (the "Dew" footman). It is on the whole a local species belonging to the southern counties. Its chief haunts are steep cliffs and downs, such as near Dover, Freshwater Bay, in the Cotswolds and also at Boxhill, but it occurs in numbers at Dungeness, where the larvae can be found sunning themselves during May on the open shingle, where they feed on a small yellow lichen. In July the moths can be seen curled around grass stems. The males come freely to light. The much smaller female is always scarcer. Occasionally the spots on the forewings are joined into a V-shaped marking.

In the same genus Barrett places *C. (Setina) mesomella*, essentially a heathland insect which occurs right up to Scotland. It can be readily flushed by day. In this insect, too, the female is always uncommon and much yellower than the male.

Last of the round-winged footmen is *Miltochrista miniata*, a very pretty species affecting woods mostly in the south, especially the New Forest, where it often swarms in late June and comes freely to light. The larvae feed on lichens on the oaks.

I now come to the main group of this family, the *Lithosiidae* proper. The insects are characterized by very narrow forewings and most of them appear in early August. I begin with *A. (L.) rubricollis* (the "Red-necked" footman), which is rather different from the others in general habits, especially as it passes the winter as a pupa. The larva is frequently beaten in the autumn from all sorts of trees and is fairly easy to bring through. The moth, which appears in early June, is found right up Scotland and is essentially a day-flier. In some years it swarms and can be seen in clouds flying swiftly in the sunshine around high bushes and tree-tops. In the evening it can often be found at rest on grasses and it sometimes comes to light. In habits it is much more like the "Cinnabar" than the rest of the group.

I will next take *Eilema (L.) sororcula*, Hufn. (*aureola*, Hb.), the Orange footman, a very pretty little insect which is the first to appear in the year, often in early May, and like the above goes through the winter in the pupal state. Its favourite resort is beechwoods, where the larvae are readily beaten in the late summer. It is chiefly a southern species which can usually be obtained by day by shaking branches and it also comes to light.

I next come to the "Pigmy," one of the most interesting species, for a long time known as *E. (Lithosia) lutarella*, L., var. *pygmaeola*, Dbldy. For many years it was considered to be confined to the Deal and Sandwich sandhills, where it sometimes appears in great profusion in late July. Soon after the last war it was discovered on the Norfolk coast, where it is quite common near Horsey Gap, though recent inroads of the sea may have upset some of its best haunts there. In 1931, at Dungeness, Dr Kettlewell caught at light a small footman which he could

not identify. On taking it to the British Museum Mr Tams recognized it as a slightly different form of *pygmaeola*. This led to a closer examination of the genitalia, when it was found that the species to which this and the Kent form belonged was really referable to *E. (Lithosia) pallifrons*, Zell., found on the Dutch sandhills, and that it was not *E. (L.) lutarella*, L., at all (vide "Entom. Record," 44 (1932), p. 8). Our race is a distinct subspecies peculiar to these Islands. The males come readily to light, while the much smaller female can be found at rest on marram heads.

Among the other species which fold their wings flat over their back is *E. (L.) griseola*, Hb. The "Dingy" footman, of special interest owing to its yellow form, f. *stramineola*, Dbldy., at one time considered a separate species. The insect which occurs on marshy ground in the south produces this yellow form in fair proportion wherever it occurs. Besides being attracted to light, it is often seen on the sugar patch.

E. (Lithosia) deplana, Esp., the "Buff" footman, is another which exhibits a good deal of variation, both light and dark forms being equally common. Confined to the south of England and Ireland it is mainly an oakwood insect, though its larvae can usually be beaten in numbers in May at Boxhill from lichens growing on old yews. Some years it appears in great profusion and this was one of the footmen which abounded in 1938.

E. (L.) lurideola, Zinck., the "Common" footman, as its name implies, is by far the commonest and most widespread of the family. In the North it is replaced by a generally smaller form which has often been mistaken for other species.

I now come to the group which fold their wings downwards along the sides of their bodies. This is the chief feature which distinguishes *E. (L.) complana*, L., the "Scarce" footman, from the last species, besides the extended yellow bar on the forewings. This insect has a curious mixture of habitats. It is found mainly on heathland, but on the sandhills of Norfolk it abounds and is occasionally found in cliff localities. The larvae in these latter haunts can often be seen sunning themselves on stones in late May.

On mosses in Northern England there may still occur what in Barrett's day was looked upon as a smaller and darker form of *E. (L.) complana*, but to which more recent authors have given specific rank under the name *sericea*, Greg., which is exclusively a British insect. Its range has always been confined to a very few mosses in Lancashire, where it may still lurk, though it has not been reported for many years except for several erroneous identifications, chiefly proving to be the small northern race of *L. lurideola*. It is to be hoped that this very interesting footman will reappear and that breeding experiments will ultimately decide what it really is, as both its genitalia and larvae are almost exactly similar to those of *E. complana*.

Akin to this species is another very local one, *E. (L.) caniola*, Hb., the "Hoary" footman, which finds its chief home on the rocky cliffs of

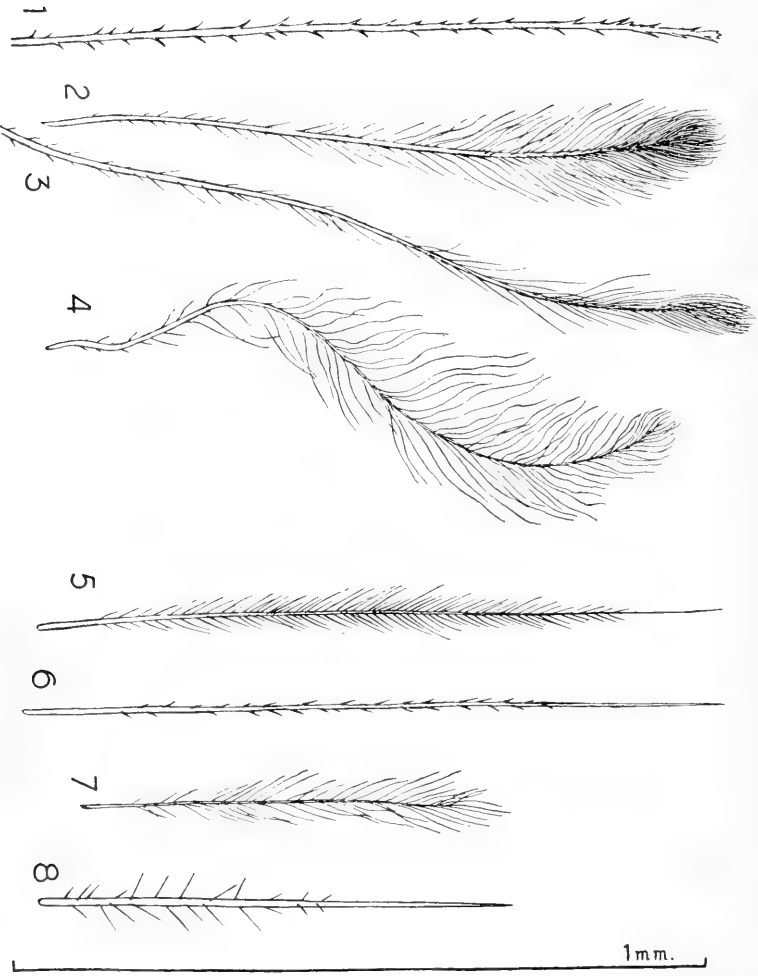
Devon and Cornwall and parts of Wales. At Torquay it may be observed in numbers flying actively at dusk from early August to mid-September, and sitting on grass heads in precipitous spots. One collector once took it in hundreds at night around the Lizard Lighthouse. Some years ago the late Mr Robert Adkin caught some pale footmen on the shingle beach near Rye in Kent which proved to be a small form of this insect. It has since turned up in the Romney Marsh area, but nowhere else in the Eastern counties. It has been found rarely in Ireland.

Last of this group is *Pelosia muscerda*, Hufn., the "Dotted" footman, one of our main objectives when we visit the Norfolk Broads, where it is widespread, occurring in all the marshes. It is the only member of the family which probably comes more to sugar than to light. It is a moth which will repay looking for. It has certainly been taken in the East Kent marshes and has been reported from the New Forest. Its larvae appears not to have been found in the wild state.

Last, and by no means least and placed in the fifth genus by Barrett, is our largest and most handsome Footman, *Lithosia* (*Oenestis*) *quadra*, L., which is the only one to exhibit remarkable sexual dimorphism, the female being the larger and handsomer insect and giving it its English name, the "Four-spotted." In late May the larvae may often be beaten from oak branches or found on the lichen-covered trunks when about to pupate, but it is one of the worst cannibals and each individual should be kept in a separate tin. This moth, above all, has years of scarcity and of great abundance. In that amazing "footman" season, 1938, it swarmed in the New Forest, where one night in early August Mr Austin Richardson and a friend saw some two hundred at light with about equal numbers of either sex. It is also a migrant and has frequently been taken at sea. In Barrett's day there was only one record for Ireland, where in recent years it has been found quite commonly in the south, while in England it has been reported as far north as the Lake District.

I have endeavoured in rather a short space of time to make a somewhat general survey of this interesting Family so far as these Islands are concerned. I am aware that there may be many further points to stress and I hope there may be several more contributors to this discussion.





THE LARVAE OF THE BRITISH LITHOSIINAE.

By E. A. COCKAYNE, D.M., F.R.C.P.

Read 9th January 1943.

Plate VII.

The *Lithosiinae* are represented in Britain by 16 species, belonging to nine genera, in eight of which there is only one British species. I have had living larvae of all except *Eilema sericea*, Gregs., and *E. pygmaeola*, Dbldy. *Comacla senex*, Hb., *Mitochrista miniata*, Forst., and *Cybosia mesomella*, L., differ from all the rest by having plumose hairs. They belong to different genera and are not very closely related. I am not prepared to express an opinion as to whether these peculiar hairs indicate a common origin, and therefore show that the three species possessing them are more closely related to one another than to the other *Lithosiinae*, or whether such have been evolved independently. Their plumose hairs may well have had an independent origin, for hairs of this type are found also in the aquatic larvae of the South American genus *Palustra*, which belongs to the *Spilosominae* (Burmeister, "Lépidoptères de la République Argentine," 1878, 5, 453; Poulton, "Proc. Roy. Ent. Soc. Lond.," 1935-6, 10, 65). *Palustra* larvae spend their lives in the water, and the function of their plumose hairs is to keep a cushion of air around the body for respiration and to prevent the larvae from becoming waterlogged. It is probable that they serve the same purpose in the footmen. *C. senex*, the only Palearctic member of the genus, lives in marshes and at times must be submerged for a considerable period. *M. miniata* is a woodland species, but there are numerous Palearctic members of the genus, and we do not know under what conditions their ancestors lived at the time when these hairs were evolved. *C. mesomella* is partial to damp heaths, but again, we do not know the early history of the genus.

The eggs of *miniata* differ in shape from those of our other footmen, and are laid at equidistant intervals instead of touching one another like those of all the other species.

Senex has a plain light brown larva. On the prothorax most of the hairs are dark coloured and nearly simple, but there are a few short pale plumose hairs; from the dorsal verrucae of all the other somites, including the 8th abdominal, arise a few conspicuous long dark plumose hairs, not more than ten from one verruca (fig. 2), a few long dark simple hairs, great numbers of much shorter pale plumose hairs (fig. 7), some pale pointed feathery hairs, and simple hairs of various types (figs. 6 and 8). On the lateral verrucae most of the hairs are pale and feathery.

The larva of *miniata* is broad, especially at the metathorax and first abdominal, and light brown in colour. On the prothorax there are pointed feathery hairs of various lengths; the dorsal and supraspira-

cular verrucae of the mesothorax bear both feathery and plumose hairs, and those of the metathorax and first three abdominal somites have dense masses of plumose hairs arising from them (fig. 4), and very few feathery ones; on each succeeding somite the pointed feathery hairs increase at the expense of the plumose ones, and some are transitional, until on the 8th abdominal all the hairs are feathery, some short and some very long. All the hairs on the subspiracular verrucae are feathery (fig. 5).

The plain blackish-brown larva of *mesomella* has simple hairs on the prothorax; on the meso- and metathorax many of the hairs are plumose and some are simple, while on the succeeding somites the masses of hair are nearly all plumose and of approximately equal length (fig. 3), until on the last two somites they are feathery rather than plumose.

The larva of *senex* is said to feed on the lichen, *Peltigera canina*, (L.) Willd., and the mosses, *Hypnum sericeum*, L., and *Weisia cirrata*, Hedw., and according to Buckler on dead leaves. Larvae sent to me by Mr A. J. Wightman thrive on pieces of old dead reed covered with algae. *Miniata* is said to feed on lichens growing on the stems and branches of trees, but Mr C. N. Hawkins fed his successfully from the egg to maturity, first on algae and then on dead oak leaves. I suspect that this is their natural food, because they are so seldom beaten from trees. I bred *mesomella* from the egg on a large grey lichen, but only one larva pupated and the moth was undersized. Buckler says it eats heather, and fresh or withered leaves of sallow in confinement, and larvae sent to me in the spring fed on fresh leaves of lettuce and dandelion.

Setina irrorrella, L., has a very pretty larva, blackish-brown with a row of orange spots in the mid-line and two orange stripes laterally. From the black verrucae spring short and long black hairs with numerous short lateral branches extending to the tip (fig. 1). It feeds on a black degraded lichen growing on chalk and shingle and on an orange lichen, and is fond of sunshine.

The remaining larvae fall into two sections, the first consisting of *Pelusia muscerda*, Hufn., *Eilema lurideola*, Zinck., *complana*, L., *sericea*, Gregs. (= *molybdeola*, Gn.), *griseola*, Hb., *caniola*, Hb., and *pygmaeola*, Dbldy., and the second of *Eilema sororcula*, Hufn., *E. deplana*, Esp., *Lithosia quadra*, L., *Atolmis rubricollis*, L., and *Nudaria mundana*, L. The larvae of the first section have short simple hairs about 1 mm. long. The verrucae are blackish or tinged with brown, and in the larvae with orange spots, such as *complana*, these lie just in front of dorsal verrucae. The larvae of the second section all have dark areas on the metathorax and on the 4th and 8th abdominal somites. The hairs are very thin and long, and some of great length arise from the last abdominal somites. They may measure 8 mm. in *deplana*, and 15 mm. or more in *quadra*. The dark patches are due to an increase in size of dark markings on the skin and to the darker colour of the verrucae. In *deplana* pale verrucae become black on the darkened somites; in *sororcula* most of the verrucae are reddish orange with a small dark area anteriorly, but are quite black on these somites; in *quadra* the verrucae are black

on the prothorax; on the meso- and metathorax the anterior trapezoidals are black and the posterior ones orange, and both trapezoidals are orange on the abdominal somites excepting the 4th, 8th, and 9th, on which all the verrucae are black. In *rubricollis*, however, the verrucae are all dull orange even on the darkened somites.

There appears to be a biological difference, as well as structural ones, between the larvae of the two sections. Those of the second section all feed on algae or degraded lichens, the first four species eating those growing on tree-trunks and branches, or on fences, while *mundana* eats those growing on stones. *Quadra*, however, is said to eat the cuticle of *Lichen caninus*, L. [= *Peltigera canina*, (L.) Willd.] and *Parmelia caperata*, (L.) Ach.

The larvae of the first section, on the other hand, prefer a more varied diet, eating fresh and dead leaves as well as lichens. I reared larvae of *griseola* from the egg on *P. canina*, but the imagines were undersized, and they do better on dead willow leaves. *Complana* eats moss, various leaves, and the flowers of bird's-foot trefoil as well as lichens. I have found larvae under logs close to freshly eaten bramble, the leaves of which they ate readily in confinement. But when I tried to rear larvae from the egg they refused to eat lichens, living or dead leaves, but grew well until November on algae. *Sericea* fed on various lichens from trees and banks, wall-moss, withered willow and oak leaves, slices of carrot and turnip, and knotgrass. *Caniola* eats black lichens growing on rocks, but also feeds on *Trifolium repens*, L., *Anthyllis vulneraria*, L., and *Lotus corniculatus*, L. *Lurideola* eats the leaves of many trees as well as lichen. The only food given for *pygmaeola* is a saline lichen, but little is known about the habits of this larva. *Pelosia muscerda* is believed to feed on algae growing on willow and alder, but it will eat fresh dandelion in captivity. All footman larvae are fond of drinking water. When I put a drop of water on the paper at the bottom of the tin, in which I was rearing *complana*, the larvae would soon congregate round it and drink until it disappeared. Larvae of *griseola* and *miniata* behaved in the same way, and when I sprayed branches covered with algae, my larvae of *deplana*, *sorocula*, *rubricollis*, and *quadra* would often drink greedily before they began to feed.

I have said little about the colour and pattern of the footman larvae, because adequate descriptions can be found in books, but I think it is worth while to make a few remarks about those of *complana* and *sericea*. South says there is no difference between them, but Buckler says the subdorsal spots of *complana* are rounded or oval and those of *sericea* are narrow- oblong, and wedge-shaped. *Complana* has a broad rust-coloured lateral stripe, in *sericea* there is a fine line of pale grey and below it a narrower line of rust colour. The only blown larva of *sericea* which I have seen is in the Tring Museum, and it has all the orange markings replaced by blackish-brown. We do not know which of these is the commoner form. Speyer says that not only is the shape of the forewings different in these two species but also the size of the costal

tuft of scales on the underside of the forewings. In spite of the similarity of the genitalia, it seems better to treat *complana* and *sericea* as distinct species, following Seitz and South, rather than to regard *sericea* as a moss form of *complana*.

LEGEND TO PLATE VII.

1. Simple hair of *Setina irrorrella* from supraspiracular verruca of first abdominal somite.
2. Long dark plumose hair of *Comacla senex* from supraspiracular verruca of first abdominal somite.
3. Plumose hair of *Cybosia mesomella* from first abdominal somite.
4. Plumose hair of *Miltochrista miniata* from dorsal verruca of metathorax.
5. Feathery hair of *Miltochrista miniata* from subspiracular verruca.
6. Simple hair of *Comacla senex* from subspiracular verruca.
7. Short pale plumose hair of *Comacla senex*.
8. Hair of *Comacla senex* from subspiracular verruca.

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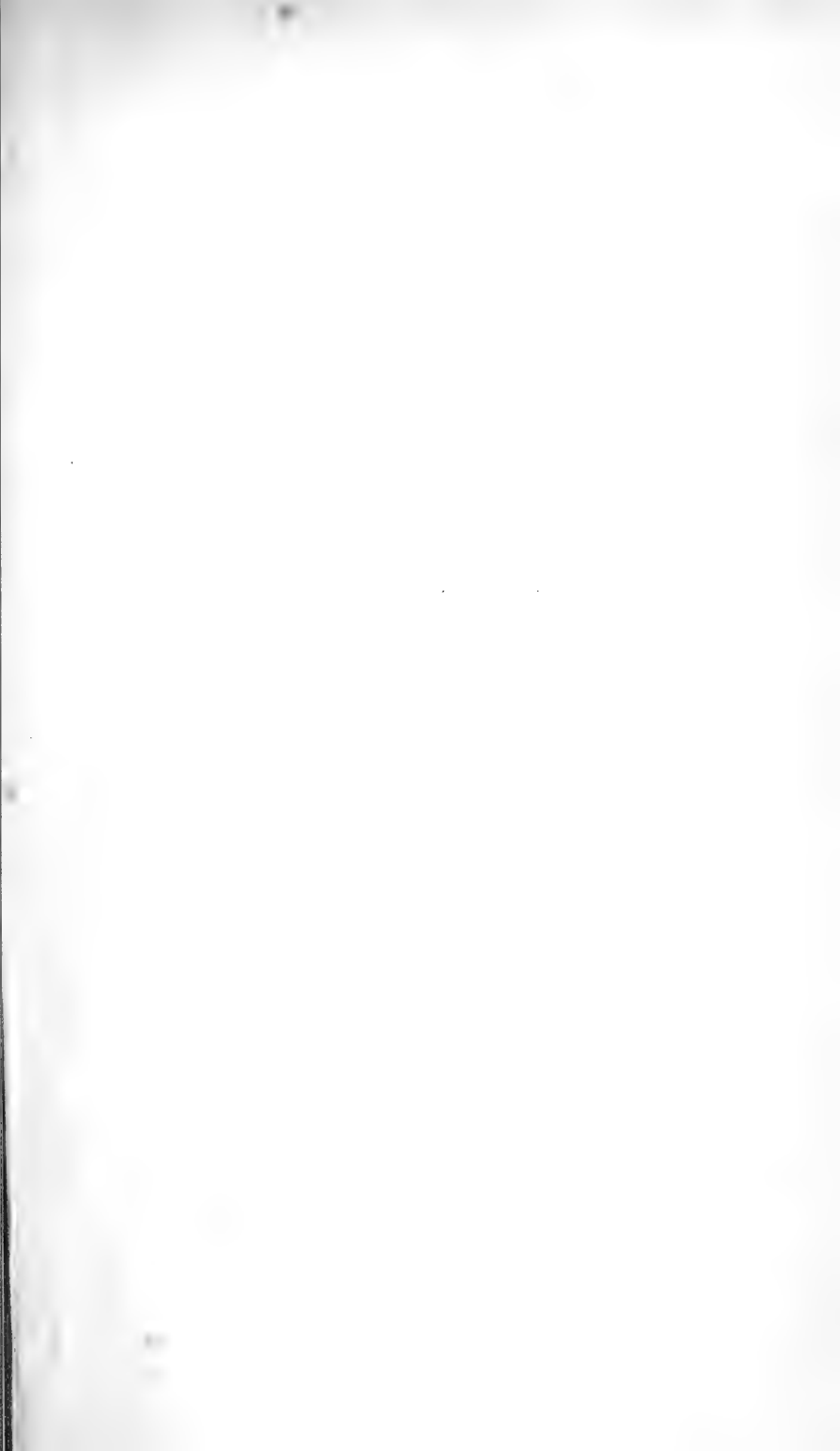
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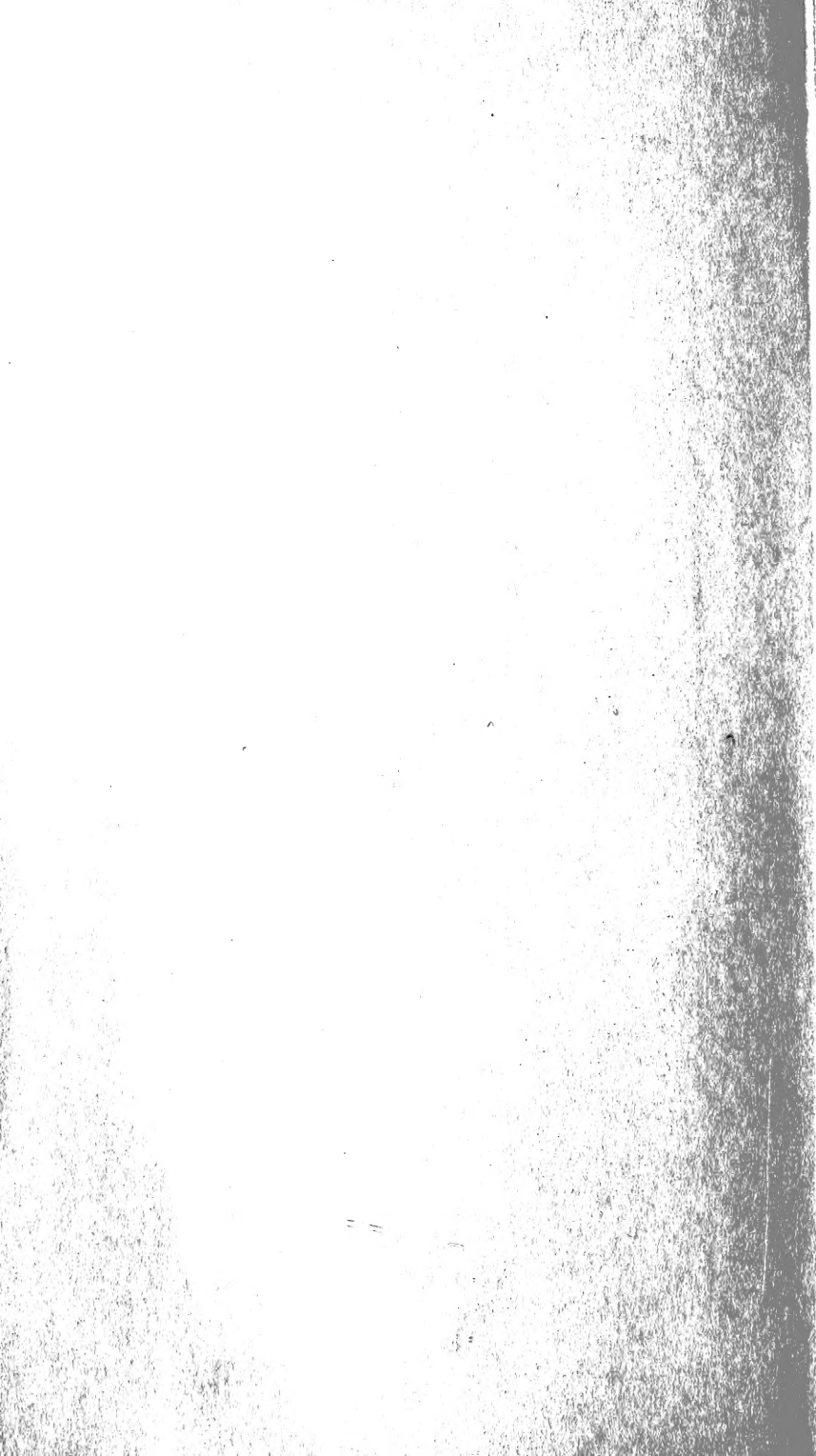
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